

**ISTANBUL TECHNICAL UNIVERSITY ★ GRADUATE SCHOOL OF  
SCIENCE ENGINEERING AND TECHNOLOGY**

**ESTIMATING STEEL FABRICATION COSTS FOR MODULAR  
SHIPBUILDING PRACTICE**

**M.Sc. THESIS**

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**Department of Naval Architecture and Marine Engineering  
Naval Architecture and Marine Engineering Graduate Program**

**JUNE 2016**



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**İSTANBUL TEKNİK ÜNİVERSİTESİ ★ FEN BİLİMLERİ ENSTİTÜSÜ**

**MODÜLER GEMİ İNŞA UYGULAMASINDA ÇELİK İMALAT  
MALİYETİNİN TAHMİNİ**

**YÜKSEK LİSANS TEZİ**

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*To those who believe in second chances,*



## **FOREWORD**

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## **ABBREVIATIONS**

<b>ADA</b>	: ADA Maritime and Shipyard Management, Inc. of Tuzla, Istanbul, TURKEY
<b>CER</b>	: Cost Estimating Relationship
<b>COMPIT</b>	: Conference on Computer Applications and Information Technology in the Maritime Industries
<b>e.g.</b>	: For Example
<b>etc.</b>	: Et cetera
<b>FP</b>	: Flanged Plate
<b>ft</b>	: Foot or feet of length (1 foot = 12 inches)
<b>GIMF</b>	: Gulf Island Marine Fabricators, LLC, of Houma, Louisiana, USA.
<b>i.e.</b>	: Namely
<b>in.</b>	: Inch of length (1 inch = 25.4 millimeters)
<b>industry</b>	: Maritime and Ship Building Industry.
<b>lbs.</b>	: Pounds of mass (1 kilogram = 2.20462 pounds)
<b>mhr</b>	: Man-hour.
<b>MS</b>	: Microsoft.
<b>NC</b>	: Numerical Control.
<b>SAi</b>	: Ship Architects, Inc. of Daphne, Alabama, USA
<b>sf</b>	: Square-foot, or square-feet of area
<b>SWBS</b>	: Ship Work Breakdown Structure
<b>t</b>	: Thickness
<b>VBA</b>	: Visual Basic for Applications.



## LIST OF SYMBOLS

$\leq$	: less than or equal to.
$\geq$	: greater than or equal to.
$>$	: greater than.
$<$	: less than.
$*$	: refers to multiplication.



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## **ESTIMATING STEEL FABRICATION COSTS FOR MODULAR SHIPBUILDING PRACTICE**

### **SUMMARY**

As in any business, shipyards are always competing with other shipyards about lowering their costs to increase their profits. The first step in getting a project into the shipyard is preparing a proposal that includes the construction cost and schedule.

Estimating the amount of material and man-power that is needed to fabricate a vessel is a complex process. As the vessel size gets larger, this estimating process also gets more complicated. Fortunately, shipyards do have estimating departments with professional estimators to handle such complex process.

Unless the shipyard has been in business for constructing the same style vessels and made a name for itself to be the “go-to” yard for such vessels, the shipyard estimators will not have the historical construction data to use a solid foundation for their proposals.

In that case, they will try to employ the common cost estimating formulas for the shipbuilding industry. The great majority of these commonly available formulas rely heavily on the vessel weight and a few vessel characteristics, such as the length or block coefficient. In addition to the vessel characteristics, these formulas have numerous “shipyard productivity” coefficients.

The main problem with the weight based common estimating methods is that they do not consider the complexity or the producibility of the design. In other words, a set number of man-hours per ton of steel is expected to cover a wide range of vessel design practices.

The main puzzle with the “shipyard productivity” coefficients is that they rely, heavily, on the estimator’s knowledge of the capabilities of the fabrication facility with a large gap between the desired and actual production efficiencies. These coefficients are subjective and, therefore, extremely difficult to monitor and improve.

The estimating approach in this thesis takes the vessel weight, length or block coefficient out of the equation and treats the shipbuilding as a fabrication process that takes place in many workstations. The time it takes to perform each task at each workstation becomes an important input value for the approach.

The other important input value is the detailed design attributes of the vessel structure. These attributes are extracted from the build sequence, 3-dimensional structural model and assembly drawings that are provided to the shipyard for the proposal preparation purposes.

The approach, then, combines the capabilities of the fabrication facility and detailed design aspects of the structure in a formulated, computer-based manner that can actually lead to a study of individual production steps that promises the most return when improved.

Although this approach can be employed for pipe systems, electrical systems and other outfitting items, this thesis focuses only on the structural estimate because the first major progress payment will, usually, be about the structural work.

In order to initiate and maintain cash flow in shipyards, the long and complicated shipbuilding process is broken into smaller milestones and, consequently, each milestone represents a payment. These payments are called progress payments. Usually, the first major milestone is the keel laying or first plate cutting that corresponds to the first major payment to the shipyard by the vessel owner.

This thesis will try to improve on the current weight-based steel fabrication cost estimating methods by examining the material and fabrication characteristics of each structural part in two structural blocks, and assigning shipyard specific work times to these parts.

This thesis is structured as follows:

Chapter 1 is a literature review to identify and compare the different methods in shipbuilding cost estimation.

Chapter 2 outlines the shipbuilding methods and summarizes the benefits of shipbuilding in blocks.

Chapter 3 examines the steel fabrication sequence and the major cost items in fabrication.

Chapter 4 provides details about the metrics that are extracted from the 3-dimensional structural model and design drawings to be used in the estimating method.

Chapter 5 provides details about the estimating algorithm, including the relations between the piece parts and metric values that are used in the algorithm.

Chapter 6 explains the reason behind selecting a super structure module for testing the algorithm. It also provides structural details and boundary information for the module.

Chapter 7 goes over the same details provided in Chapter 6 for the other module that is used to test the algorithm.

Chapter 8 shows the results of the VBA method in estimated man-hours. It compares the calculated results and mentions other benefits of the VBA method.



## MODÜLER GEMİ İNŞA UYGULAMASINDA ÇELİK İMALAT MALİYETİNİN TAHMİNİ

### ÖZET

Herhangi bir iş alanında olduğu gibi, tersaneler de her zaman kârlarını arttırmak için maliyetlerini düşürme konusunda diğer tersaneler ile yarışıyor. Tersaneler için bir proje elde etmenin ilk adımı, inşaat maliyeti ve zamanlamasını içeren bir teklif hazırlamakla başlıyor.

Bir gemiyi inşa etmek için gereken malzeme ve insan gücünü tahmin etmek karmaşık bir süreçtir. Geminin boyutu büyüdükçe, bu tahmin süreci de daha karmaşıklaşır. Tersanelerde, bu karmaşık süreci yönetebilecek profesyonel kişiler görev yapmaktadırlar.

Eğer bir tersane sürekli aynı türdeki gemileri inşa etmiyorsa, tahmin ve teklif hazırlanırken gerekli sağlam bir temel oluşturacak tarihsel inşa verileri olmaz.

Böyle bir durumda, gemi inşa endüstrisi için ortak maliyet tahmin formüllerine başvurulur. Bu yaygın olarak kullanılan formüllerin büyük çoğunluğu gemi ağırlığı ve uzunluğu veya blok katsayısı gibi bir kaç gemi özelliklerini baz alırlar. Gemi özelliklerine ek olarak, bu formüller çok sayıda "tersane verimlilik" katsayılarına sahiptirler.

Ağırlık esaslı ortak tahmin yöntemleri ile ilgili temel sorun ise bu yöntemlerin, tasarımın karmaşıklığını veya üretilebilirliğini göz önünde bulundurmamalarıdır. Diğer bir deyişle, yaygınca kullanılan ton çelik başına düşen adam saat miktarının geniş bir tasarım yelpazesine uygun olabileceği beklenmektedir.

"Tersane verimlilik" katsayısı ile ilgili esas muamma ise bu rakkamın ağır bir şekilde teklif hazırlayan kişilerin bilgisine bağlı olması ile istenen ve gerçek üretim verimlilikleri arasında büyük bir boşluğun olmasıdır. Bu katsayılar kişisel bakış açısına bağlı olduklarından takip etmek ve geliştirmek çok zordur.

Bu tez çalışması dahilindeki tahmin yaklaşımı, geminin ağırlık, uzunluk veya blok katsayısı gibi karakterlerini göz ardı eder ve gemi inşa sürecini, çeşitli atölyeleri kapsayan bir üretim süreci olarak ele alır. Her atölyedeki işi gerçekleştirmek için gereken süre, bu tahmin yaklaşımı için önemli bir girdi değeri olur.

Diğer bir önemli girdi değeri ise geminin detaylı tasarım nitelikleridir. Bu özellikler, teklif hazırlanması için tersaneye verilen, fabrikasyon sırası, 3 boyutlu yapısal model ve montaj çizimlerinden elde edilir.

Bu tez çalışması dahilindeki tahmin yaklaşımı, atölyenin verimliliğini ve geminin detaylı tasarım yönlerini bilgisayar tabanlı bir şekilde birleştirir ve daha sonra en fazla getiriyi vaat edebilecek bireysel üretim aşamalarının inceleneceği bir çalışmaya yol açabilir

Bu tez içeriğindeki tahmin yaklaşımı aynı zamanda boru sistemleri, elektrik sistemleri ve diğer donatım öğeleri için de kullanılabilir ancak, bu tez sadece yapısal tahminlere odaklanır çünkü ilk büyük hakediş, genellikle, yapısal çalışmalarla ilgilidir.

Tersanelerde nakit akışını başlatmak ve sürdürmek için, gemi inşa süreci daha küçük “kilometre taşları”na bölünür ve dolayısıyla her kilometre taşı bir ana ödemeyi temsil eder. Bu ödemelere hakediş denir. Genellikle, ilk büyük kilometre taşı omurga döşeme veya birinci plaka kesimi ile ilgilidir ve gemi sahibi tarafından tersaneye yapılan ilk büyük ödemeye karşılık gelir.

Bu tez, iki bloğu inceler alır ve her yapı parçasının malzeme ve imalat özelliklerini inceleyerek, her parçaya tersaneye mahsus parça işleme sürelerini atayarak, mevcut ağırlık bazlı çelik imalat maliyet tahmini yöntemleri geliştirmeyi amaçlar.

Bu tez aşağıdaki gibi yapılandırılmıştır:

Birinci bölüm, gemi maliyetinin tahmininde kullanılan farklı yöntemleri belirleyen ve karşılaştıran bir literatür incelemesini içerir.

İkinci bölüm, gemi inşa yöntemlerine değinirken, bloklarla üretim yönteminin faydalarını özetlemektedir.

Üçüncü bölüm, çelik imalat süreci ve üretiminde önemli olan maliyet öğelerini inceler.

Dördüncü bölüm ise 3-boyutlu yapısal model ve tasarım çizimlerinden türetilen ve tahmin yönteminde kullanılacak metrikler hakkında ayrıntılar verir.

Beşinci bölüm, algoritmada kullanılan çelik parçalar ve metrik değerleri arasındaki ilişkileri detaylarken, tahmin algoritması hakkında ayrıntılı bilgi sağlar.

Altıncı bölüm, algoritmanın üzerinde uygulandığı bir üst yapı bloğunun seçiminin arkasındaki nedenleri açıklar. Aynı zamanda, bloğun yapısal ayrıntıları ve blok sınırları için bilgi verir.

Yedinci bölüm, algoritmanın üzerinde uygulandığı diğer üst yapı bloğu hakkındaki bilgileri, altıncı bölümde verilen ayrıntılarla, sunar.

Sekizinci bölüm, bu tez kapsamındaki VBA yöntemiyle tahmin edilen adam saat sonuçlarını içerir. Hesaplanan sonuçları karşılaştırır ve VBA yönteminin diğer avantajlarına değinir.



## 1. INTRODUCTION

Ship design and construction is a complicated process and often viewed from a technical perspective. It should not be forgotten that ship design and construction is also a business venture and must succeed financially as well as technically (Ross 2004).

Today's shipbuilding industry demands shipyards to fabricate faster, cheaper and without sacrificing quality. This is a natural result of the ever-increasing competitive nature of the business.

In the quality, cost and schedule triangle, quality seems to be the only constant. In an industry that supports the "you are as good as your last work" type of attitude, quality can only be improved from project to project. That leaves the cost and schedule as variables.

The material and equipment costs also do not provide major savings by themselves, unless the design agent is also designing the vessel for producibility. The importance of focusing on the economical impacts of design decisions is summarized in Table 1.1 (Shetelig, 2013), (Michalski 2004). Table 1.1 shows that the design phase has approximately 10% share in the total building costs but it determines 85% of the total building costs.

**Table 1.1:** Cost distribution per design phase

<b>Design Phase versus Production</b>	<b>Cost of each phase</b>	<b>Impact on total building costs</b>
Preliminary Design	3%	60%
Subsequent Design Phases	7%	25%
Production	90%	15%

Production, on the other hand, is much more costly compared to the design. This shipbuilding activity requires a lot of labor. There is very little room for improvements in the total building costs at this late stage. However, for a shipyard that has a fixed-bid contract to build a ship, the 15% impact is where all the focus concentrates.

For example, the ship hull of a passenger ship (steel part) represents approximately 20% of the cost of the ship and the cost of labor represents about 60% of the cost of the ship hull (Caprace et al 2006).

Labor cost and workstation productivity are the two major areas where a shipyard can gain considerable savings by investigating efficient ways of fabricating the vessel. This investigation will be the result of examining the estimated labor time against the actual fabrication time with the purpose of improving productivity.

In the case of estimating the steel fabrication time, shipyards commonly use numerous man-hour per ton type of formulas. These formulas provide quick answers. Each formula has been adjusted according to results of past projects in each shipyard. Because past experiences have such important roles in the accuracy of this estimating method, when sub-contractors are brought in the project, shipyards and sub-contractors often have differences in cost and schedule.

Unless these formulas are applied to similar vessel types and similar designs, they also inadequately address the complexity of the structural design.

## **1.1 Cost Estimating Approaches**

The ability to estimate ship construction costs is necessary for the commercial success of a shipyard; too high an estimate will place the shipyard out of the competitive range and too low an estimate will result in a financial loss and possible bankruptcy (Ross 2004 and Caprace et al 2006).

The estimation of labor man-hours necessary for ship production, as a part of shipbuilding cost, has usually evolved at two stages of detail. The early stage provides only a preliminary estimate before any details of ship design and production processes are considered. Such preliminary estimates are usually made using empirical equations based on the ship weight, size and other general design

parameters (Rashwan 2005). The methods that can be employed early in the design process, normally, require less information (Bertram et al 2005).

More involved, methods can be employed later in the design process when more input data is available as the design matures (Bertram et al 2005). A more detailed man-hour estimate starts after signing the contract, as the information of the project increases parallel with detail ship design so as to make suitable planning and scheduling for shipbuilding process (Rashwan 2005).

Estimating the man-hours required to construct a ship's block is not a straightforward process. The different parts that compose a block usually require different methods of construction and will have different work content. Therefore, blocks differ from each other in many aspects of construction and design (Abbott et al 2011).

Traditional approaches for estimating the ship production man-hours suffer from two main disadvantages. The first one is that the shipyard must establish an equation for each ship type, based on its past production data. The second is that these equations do not reflect the impact of any progress and development in the ship production process on the predicted man-hours (Rashwan 2005).

An extensive literature review revealed that the cost estimating methods can be classified as intuitive, analogical, parametric, and analytical methods (Ben-Arieh 2003). A brief explanation of each method with their benefits and shortfalls is provided as follows:

### **1.1.1 Top-Down method**

This is a historical approach. It is also known as the statistical method (Caprace et al 2006). This method determines the production cost from global parameters such as the weight of the hull, the block coefficient, the ship length etc. (Caprace et al 2012). The relationship between cost and global parameters is found by evaluation of previous ships. (Bertram et al 2005). Cost estimators create formulas, based on years of experience, industry trends, and vendor data. Typically, estimators guard this information closely, thus making its accuracy difficult to confirm (Ross 2004). It is up to the estimator to judge whether a project has unique design characteristics or if it is comparable to historical data. Some top-down methods, therefore, rely on “expert judgment” (Shetelig 2013).

The top-down approach is only applicable if the new design is similar to these previous ships. Additionally, the cost estimation factors in this approach reflect past practice and experience. Despite its popularity and frequent references in the literature, top-down approaches have serious disadvantages (Bertram et al 2005), (Caprace et al 2012):

- The approach uses only global information. Therefore, it does not consider local form changes or the details of the design improving producibility.
- The approach is usually based on weight. Any change, which increases weight, will automatically increase the cost estimate, regardless of the real effect on cost.
- The approach is based on historical data. The historical data and formulas may not reflect new approaches in structural design or production technology.
- The data is frequently skewed, reflecting pressures of the first-line managers and other factors.
- This approach is not suitable for structure optimization, as there is no link between the cost and the scantlings.
- This approach can produce acceptable results in cases where the shipyard constructs a single or a few ship types and sizes. This approach is not so dependable for ship types or sizes beyond those normally constructed at the yard, or as costs become outdated (Ross 2004).

The weight of the block is not an accurate guideline as to the construction man-hours. Even though two blocks may be similar in weight, as well as the thickness of the steel plate used, the number of component parts can differ significantly (Abbott et al 2011).

Both weight estimates and cost estimates share common challenges (Ross et al 2005):

- Lack of available data – weight and cost estimates are based on the previous designs. In certain cases, when the shipyard is entering a new market, no relevant data is available (Ross et al 2005). Shipbuilding and operating cost data are scarce. They are usually related to different time periods (Michalski 2004).
- Inconvenient data format – Data may be provided in hard copy and not in electronic format (Ross et al 2005). Shipbuilding and operating cost data are

presented in a form of diagrams or tables of little use for computational methods (Michalski 2004).

- The unknown validity of data – the data itself may be estimated and not a record of actual costs. Costs may have changed because of different suppliers.
- Insufficient parametric estimating capability – Parametric formulas may not support the type of the ship being designed or fabricated.
- Lack of software capability – changes to parametric formulas or links between weight and cost modules may not be updated.
- Lack of time – A period of weeks for developing estimates is commonly seen as more than adequate for the purpose or needs.
- Organizational constraints – different shipyard departments are involved in estimating functions. Communication tends to flow in one direction; the design is being provided to the estimators. This type of communication is termed “throwing the design over the wall”.

### **1.1.2 Bottom-up method**

This is a rational assessment. It is also known as the engineering analysis method (Caprace et al 2006). This method breaks down the project into elements of work and builds up a cost estimate in a detailed engineering analysis. The total number of necessary man-hours is then the sum of all man-hours for the individual work processes. Like the top-down approach, the bottom-up approach has its own challenges (Bertram et al 2005):

- The bottom-up approach requires more effort and detailed information than the top-down approach.
- At present, this approach is not available in most shipyards. Neither are historical databases from which it could be developed (Bertram et al 2005), (Ross 2004). It is then necessary to develop an appropriate method and collect the data required to use the approach.
- As the design matures, costs may be estimated based on drawings, bills of materials, historical vendor costs, and existing quotes. The bottom-up approach is only practical after the design has reached a level of significant technical maturity (Ross 2004), (Shetelig 2013).

### **1.1.3 Parametric method**

Parametric methods can be placed between the top-down and bottom-up methods. The basis for the parametric cost estimation method is the use of cost estimating relationships (CERs) (Shetelig 2013). A CER is a formula that is able to relate an item's cost to its physical or functional characteristics (Ross 2004). This relationship between costs and relevant parameters is based on regression of historical data (Shetelig 2013), (Liu et al 2005), (Caprace et al 2012).

A series of cost estimating relationships (CERs) is used in conjunction with the Ship Work Breakdown Structure (SWBS) groups to produce cost estimates (Deschamps et al 2003). Costs can be estimated both at very high levels and at very low levels. It can also be used to relate an item's cost to the cost of another item or group of items (Smith 2004).

In this parametric approach, system and subsystem costs are not weight-based but are characterized as a proportion of overall metrics such as length, volume, displacement or deadweight (Deschamps et al 2009). The proportions are estimated through comparisons with similar ships. If correlation levels are high, then the parametric approach yields good predictions. Otherwise, the estimates may not be sufficiently accurate for many technical and business decisions (Ross 2004).

Labor costs are collected time charges to production work orders. Material costs are collected from purchase orders. Shipyard estimators compile and analyze this data and apply the resulting cost to functional characteristics of the ship (Smith 2004).

The main challenge with CERs is determining what type of CER is appropriate for any given type of design process.

### **1.1.4 Analytical method**

The analytical method allows evaluation of the cost of a product from a decomposition of the required work into elementary tasks, operations or activities with known (or easily calculated) costs (Ben-Arieh 2003). This system differs from the other systems in two ways. First, cost pools are defined as activities rather than production cost centers. Secondly, the costs are assigned to cost drivers based on the number of activities used (Akyol et al 2007). The cost generating activities must be

determined and the cost of these activities must be linked to the resulting products and services (Ben-Arieh 2003), (Akyol et al 2007).

The analytical method improves the accuracy and relevance of product costing. This method provides timely cost information, which results in more detailed tracking of indirect costs. This method provides information and answers questions about how a product is produced, how much time is needed to perform an activity and how much money is absorbed by performing this task (Akyol et al 2007).

However, it does require additional effort and expense in obtaining the information required for the analysis (Ben-Arieh 2003).

### **1.1.5 Standard ship approach**

Some shipyards offer standard ship designs for which cost characteristics are well known. This enables the yards to quickly and confidently develop detailed bids for prospective customers and is an excellent solution if the designs match the customers' requirements. However, even with the flexibility for making limited changes to the design, many customers prefer to purchase a ship that is more closely aligned to their business needs (Ross 2004).

If the work conditions vary from that of the assumptions of this estimating method, additional factors should be applied to compensate for any shortfall (Butler 2000).

## **1.2 Literature Review**

Shetelig, 2013, offers a top-down cost estimating method for developing CERs expressing the relative consequences on the total costs due to changes of cost driving parameters. This method provides theoretical consequence on the total ship cost when ship performance parameters are theoretically changed.

Caprace, 2012, develops a CER for steel hull manufacturing based on blocks and unit breakdown. The CER includes quantity and cost-per-unit values as well as multipliers for cost adjustments, learning curve adjustments, economic inflation adjustments, workmanship productivity adjustments, and complexity and accessibility adjustments.

Abbott, 2011, considers a video analysis method and studied video recordings of various fitting processes over a period of four weeks. Instead of using the physical

characteristics in formulas, this method captures activities that may not normally be considered when estimating such as the down time when workers are stopped for safety reasons when large parts are being transported by cranes.

Caprace, 2009, focuses on the multi-criteria analysis for addressing the relevance of the different parameters of interest to answer the important question of which of the estimating methods provides the best results. The multi-criteria analysis gives the ranking of the alternatives for the model, once all parameters and the values are present.

However, how the weights in the multi-criteria analysis are assigned is an unresolved issue, because the ranking methodology does not follow a standard procedure.

Cagalj, 2009, expresses productivity in the global shipbuilding industry in two ways: man-hours per compensated gross tonnage, and compensated gross tonnage per employee per year. The accuracy of this method depends on the assembly and non-assembly types of shipyards and inclusion of the total yard employment, sub-contractor and office hours.

Smith, 2008, develops the combined cost model to include life cycle costs and upgrades the existing cost estimation model for the acquisition costs.

Rashwan, 2005, uses the productivity metric, man-hours per compensated gross tonnage as a unified parameter for predicting the ship production man-hours.

Liu, 2005, explains the inadequacies of the weight-based linear regression methods and provides a method that addresses the non-linear relationship between products and man-hours. This algorithm is called the artificial neural network.

Michalski, 2004, employs a top-down model for predicting the building costs of ships. This particular method uses regression analysis for determining the coefficients of approximation formulas.

Ben-Arieh, 2003, successfully applied the activity-based cost management with five input parameters, despite the additional effort and expense required in obtaining the information required for the analysis.

### **1.3 Purpose of Thesis**

The purpose of this thesis is to give Istanbul Technical University and Maritime Industry a valuable document for developing a method to estimate the cost of fabricating structural blocks or modules in terms of man-hours, based on the expertise and production experience of Ship Architects, Inc. (SAi), ADA Maritime and Shipyard Management, Inc. (ADA), and Gulf Island Marine Fabricators, LLC, (GIMF).

When the referenced studies and algorithms are examined, a large portion of them can be grouped either under the traditional top-down approach category or under some type of analytical method that employs complicated software that can examine behavioral patterns with numerical or visual input.

By the time a design reaches the shipyards and fabrication facilities, it has matured enough to be ready for fabrication. That means a bottom-up approach may be a better method for estimating the fabrication costs if the time at each workstation can be documented.

A simple bottom-up approach coupled with commonly used software would be useful to the majority of shipyards and fabrication facilities in their attempts to improve their profits.

While investigating shipyard interest for such topic, it became apparent that the fabrication cost of each block had a higher importance among shipyards. A trip to ADA shipyard in Tuzla, Istanbul in April 2015, marked the start of this thesis.

### **1.4 Objective of Thesis**

This thesis aims to provide a computer-based cost estimating method to improve the current manual methods. This method uses the material attributes and the build strategy information that are normally available in the three-dimensional structural models and combines them with the shipyard productivity to achieve more comprehensive man-hour estimates in less time.

This thesis will explore the use of “behind the scenes” properties of already-modeled parts in cost estimation after the assembly drawings are developed. It will explore the use of the material attributes of each part that are not so visible on typical assembly drawings. These attributes will be explained later in detail.

Currently, steel weight is the most commonly used variable in estimating the structural fabrication cost of a vessel, based on various man-hour per ton types of values. These types of values are commonly available in the industry but omit the complexity of the structural design. For example, a 1 inch thick, 10 feet wide and 40 feet long piece of steel plate weighs the same as 4 pieces of 1 inch thick, 1 feet wide and 40 feet long plates. A weight-based estimating method will not be able to address the added cost due to cutting, handling, fit-up and welding of four pieces of plates versus only one. Similarly, if a new welding technique is used which takes 25% fewer man-hours per foot of weld, no change would be reflected in the cost estimate, because there is no change in the weight of the ship. Therefore, if a change in the design or production process has no impact on weight, then the cost assessment will not change (Caprace 2009).

When such complexities are addressed, it is normally a manual process and requires the attention of a qualified person such as a senior project superintendent or a structural estimator for a few days, depending upon the size and density of assembly drawings.

The estimating approach in this thesis will be helpful for cutting down the estimating time and obtaining production related, insightful, information. It may be another valuable tool for increasing profits.

## **2. SHIPBUILDING METHODS**

Traditionally, steel parts were erected piece by piece on slipways. Outfitting followed the steel work.

Before welding, the keel of the vessel was laid, frames and girders were erected and plates were fitted in a similar method to fitting wood planks on wooden ships. Machinery and outfitting were then placed into the completed hull. It was an expensive process because all outfitting work had to be done in confined spaces. The entire process for building the ship had a rigid tradition and sequence that needed to be followed.

The introduction of welding in the 1940's enabled pre-fabrication. All parts did not have to be fitted at the most expensive stage of fabrication. Steel parts were erected in pre-fabricated assemblies on slipways, moving away from the piece by piece tradition. After the modular construction techniques were introduced, steel work and outfitting were carried out concurrently as soon as there was sufficient structure to support the outfitting. This method of construction also allowed paint to be applied to the inside and outside of the blocks much sooner in the fabrication process, with only small amounts of bare surface remaining around the erection joints.

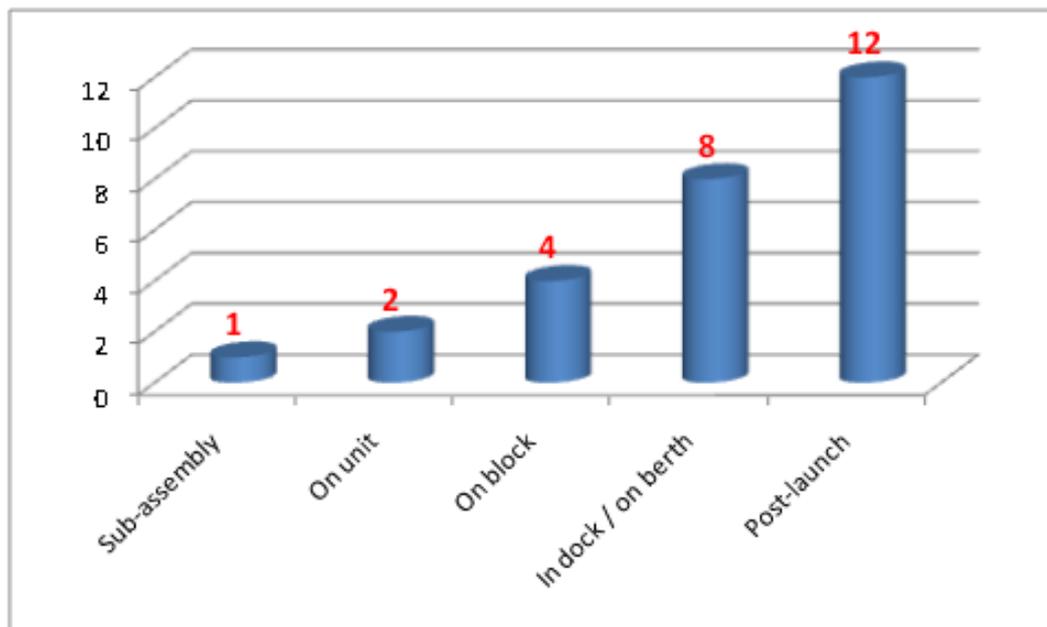
### **2.1 Benefits of Shipbuilding in Blocks**

Since modular construction allows the shipyards to work on smaller chunks of the vessel at a time, improvements in the following areas became natural for steel fabrication and outfitting:

- Multiple sections of the hull and superstructure can be fabricated in forms of blocks in different erection areas within the shipyard, or in an off-site location.
- Down-hand welding can be employed with the implementation of panel lines.
- “Blue sky” access for assemblies and equipment improves fit-up and installation times while reducing large capacity crane usage.

- Smaller block sizes move the fabrication of modules into covered workshops where tools are readily available. Work areas are protected from the elements, and work stations are better equipped to address human factor concerns.
- Smaller block sizes also reduce the number of people who work in the same area.
- Assemblies can be erected close to the workshop floor, which reduces the need for scaffolding.
- Steel fabrication and outfitting times overlap to reduce the fabrication time while keeping all trades employed and occupied regularly.
- Reduced fabrication time relates to frequent progress payments, which positively impacts the cash flow.

The goal is to keep the size of these “smaller chunks” as large as possible while taking full advantage of the capabilities of the production facility. In addition to the benefits that are listed above during the fabrication of blocks, larger blocks require less work to erect in the dock or on the berth. Cost of work by stage of construction is summarized in Figure 2.1:



**Figure 2.1:** Cost of work by stage of construction (Stott, 2013)

Rubeša et al, 2011, suggest that after collecting rules of thumb data and processing statistical data in the observed shipyard on various types of ships during a longer period, the labor costs on board can be on average 3-5 times higher than equivalent work done in the shop or on the platform.

## **2.2 What Needs to be Known Before Fabrication**

There are two items that need to be determined before the fabrication of blocks can start.

The first one is related to the capabilities of the fabrication facility in terms of the size of each block based on the available crane capacities, capacity of each work station, size of the erection areas, etc.

The second one is related to what needs to be fabricated, such as the cost estimate to properly budget, and the time estimate to properly schedule, the fabrication process for the shipyard and sub-contractors.

Similar estimating methods can also be applied to the pipe, ventilation, air-conditioning and electrical systems.

This thesis only focuses on estimating the steel fabrication cost, because steel erection is the first step in ship construction. Keel laying and plate cutting milestones, and associated progress payments, are crucial to the fabricators of the vessel.

### **2.2.1 Size and cost of each block**

The block sizes are simply determined by the capabilities of the shipyard or the fabrication facility. These capabilities are actually the limitations of the facility in a sense that if the facility has a very small area to erect the pre-assembled panels, the overall size of the block will be limited to the size of that erection area.

Another example is related to the size of the panel line. If the panel assembly line can only accommodate one 40 feet by 10 feet plate at a time, the entire structure of the vessel has to be broken into 40 feet by 10 feet sections.

If on the other hand, the panel line is improved to have a pre-assembly stage where up to five 40 feet by 10 feet plates are welded together to form the base for panels, the block size can be increased accordingly; provided that the previous limitation, block erection area, is large enough to accept the larger blocks.

Another major component for determining the block size is the crane capacities in the fabrication facility. As the lifting and turning process for each panel and sub-assembly is an unavoidable part of shipbuilding process and the cranes are the major

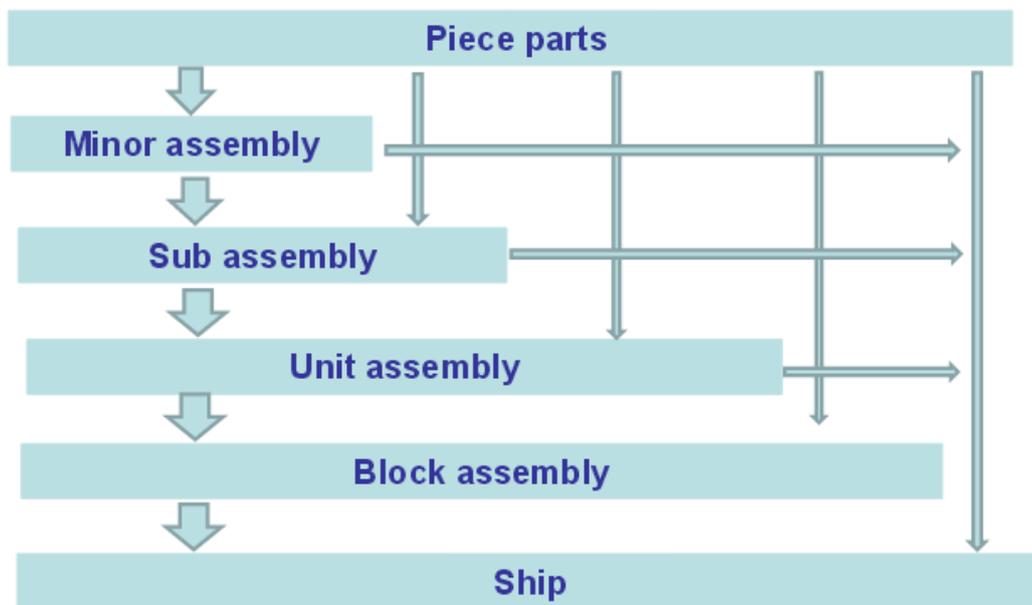
equipment for such process, the number of cranes in the erection area and the capacity of each crane for handling panels and sub-assemblies must complement each other.

Naturally, there is always the cost aspect when sizing the blocks. As in any business, shipyards are also concerned about maintaining cash flow, and the cash flow is, usually, tied to some form of completion in terms of progress payments. Too large of a block may take a long time to complete if the work force is limited in the fabrication facility.

Additional cranes may be needed if the block size does not complement the capacity of the available cranes. Renting or purchasing additional cranes will naturally increase the cost of fabrication.

### 3. STEEL FABRICATION

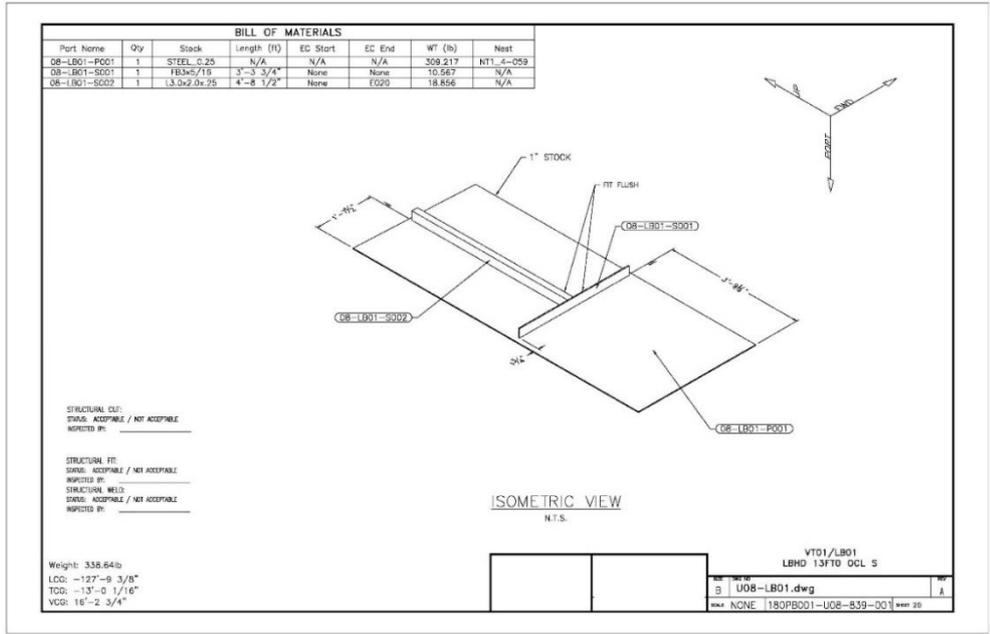
The steel manufacturing process has a complex structure. In order to understand this complex structure, a build strategy has to be developed. In this build strategy, the complex structure is broken up into smaller work products. These smaller products are organized in a hierarchy of stages based upon their sequence in the build strategy. This relationship is simply shown in Figure 3.1:



**Figure 3.1:** Relation of assembly stages in build strategy (Stott, 2013)

The piece parts are simply the individual parts that are primarily used to put the minor assemblies together. These parts can be individual stiffeners, brackets, clips, stanchions, etc. and based on the build strategy sequence, as shown above, they can be introduced into the fabrication process at any level.

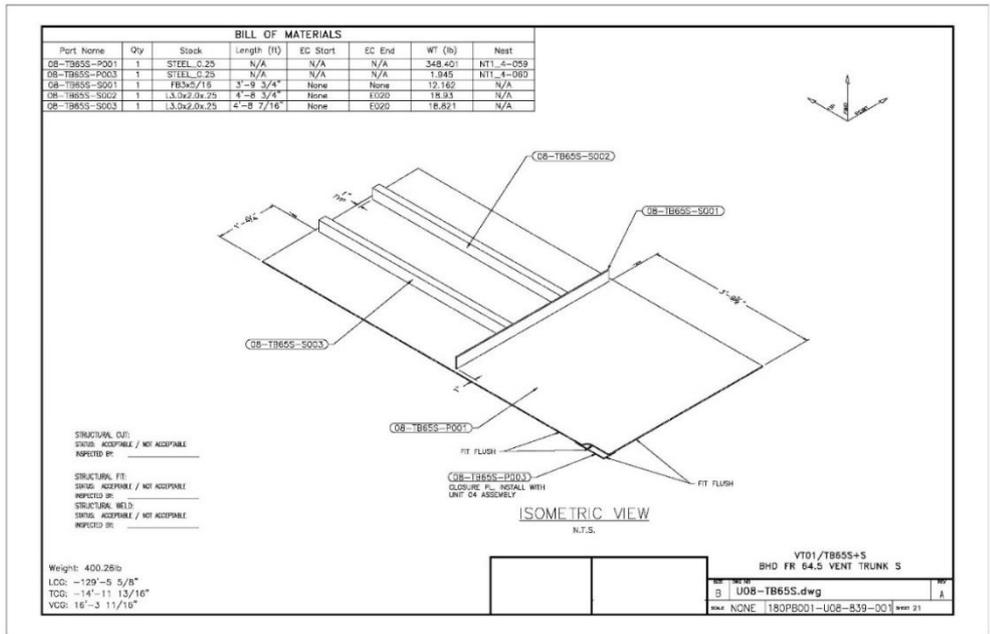
A good example of a minor assembly is shown in Figure 3.2. Three individual piece parts: a plate named 08-LB01-P001, a flat bar stiffener named 08-LB01-S001, and an L profile named 08-LB01-S002 are brought together to form a minor assembly named LB01.



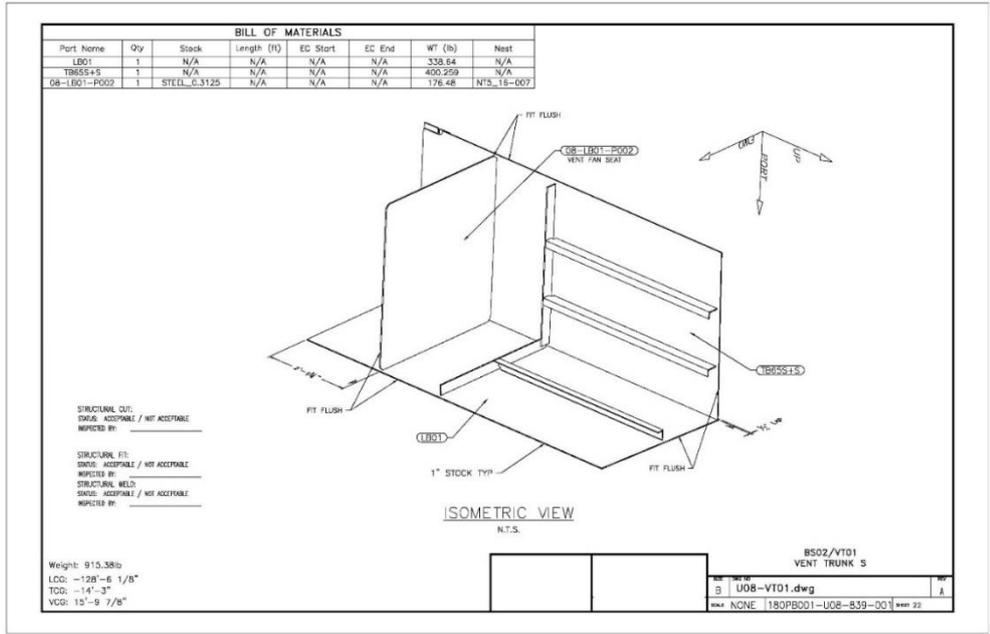
**Figure 3.2:** Simple minor assembly of LB01

Another minor assembly, TB65S+S, with five individual piece parts is shown in Figure 3.3.

A sub-assembly level is where multiple minor assemblies, and other piece parts, are brought together. The VT01 sub-assembly is shown in Figure 3.4. The two minor assemblies above, LB01 and TB65S+S, are joined and a piece part, 08-LB01-P002, is added.

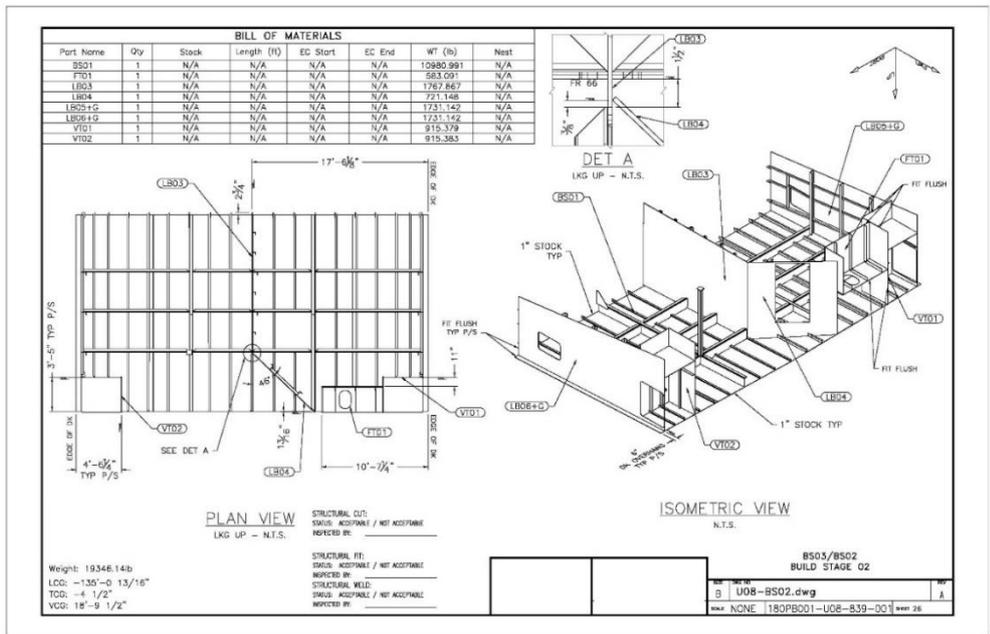


**Figure 3.3:** Simple minor assembly of TB65S+S



**Figure 3.4:** Sub-assembly of VT01

Eight sub-assemblies are shown in one unit assembly level, BS02, in Figure 3.5. The sub-assembly of VT01 can be seen in middle right hand side of Figure 3.5. In this particular case, no piece part is needed to be included at this level.



**Figure 3.5:** Unit-assembly of BS02

In order to form a block, multiple unit assemblies are put together with other minor assemblies, sub-assemblies, and even piece parts, all in accordance with the build sequence. In Figure 3.6, the BS02 sub-assembly is grouped with one minor assembly

of ST01, two flatbar coaming piece parts to form the deck edge, and six brackets to support that coaming piece.

For ease of construction, the BS03 block is fabricated upside-down. In order to position the block on the vessel, it is turned the right-side-up. The final orientation of the block BS03 is shown in Figure 3.7.

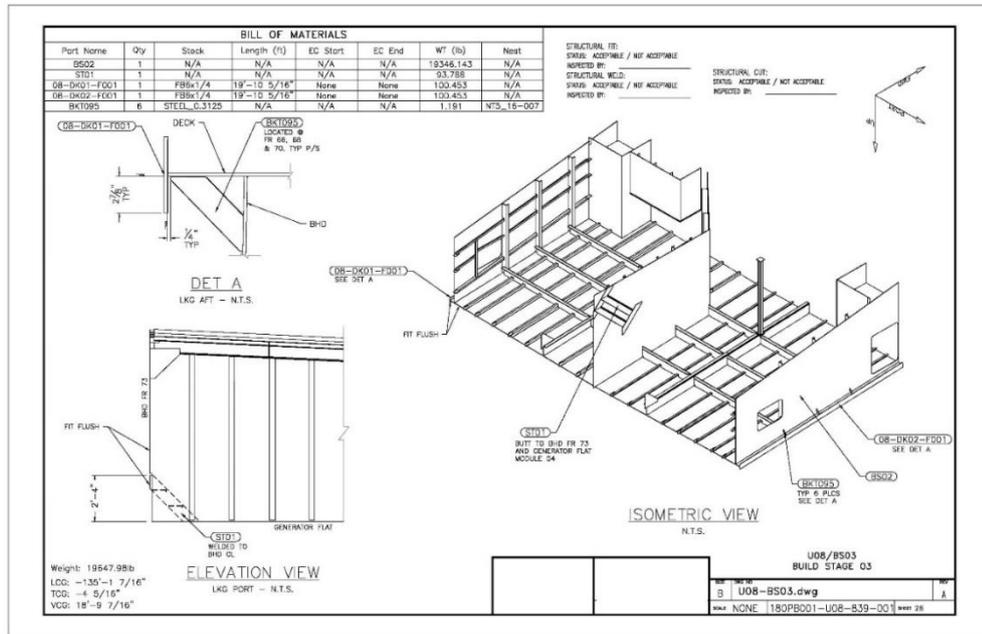


Figure 3.6: Block assembly of BS03

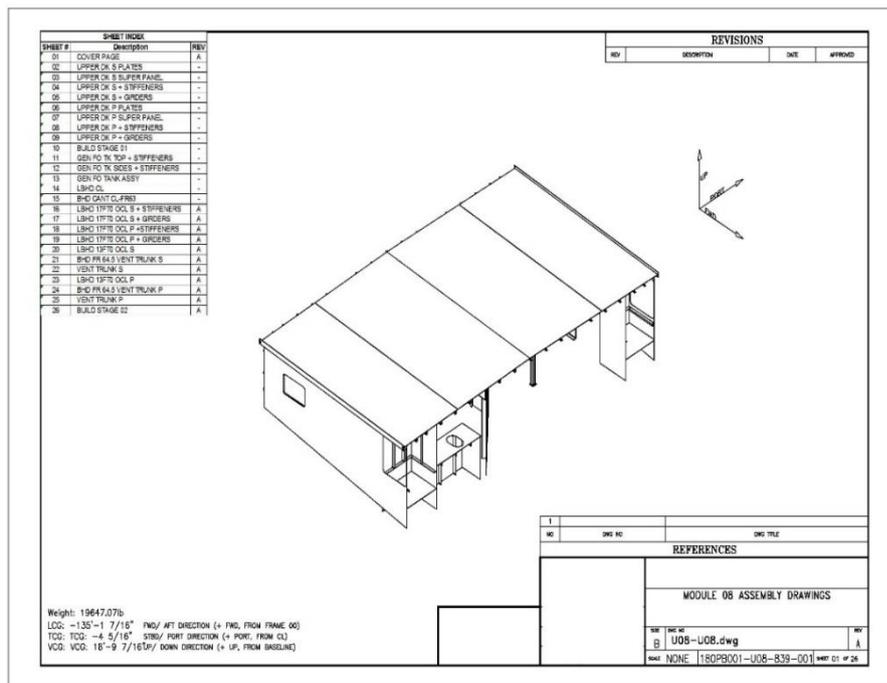


Figure 3.7: Block BS03 before positioned on the ship

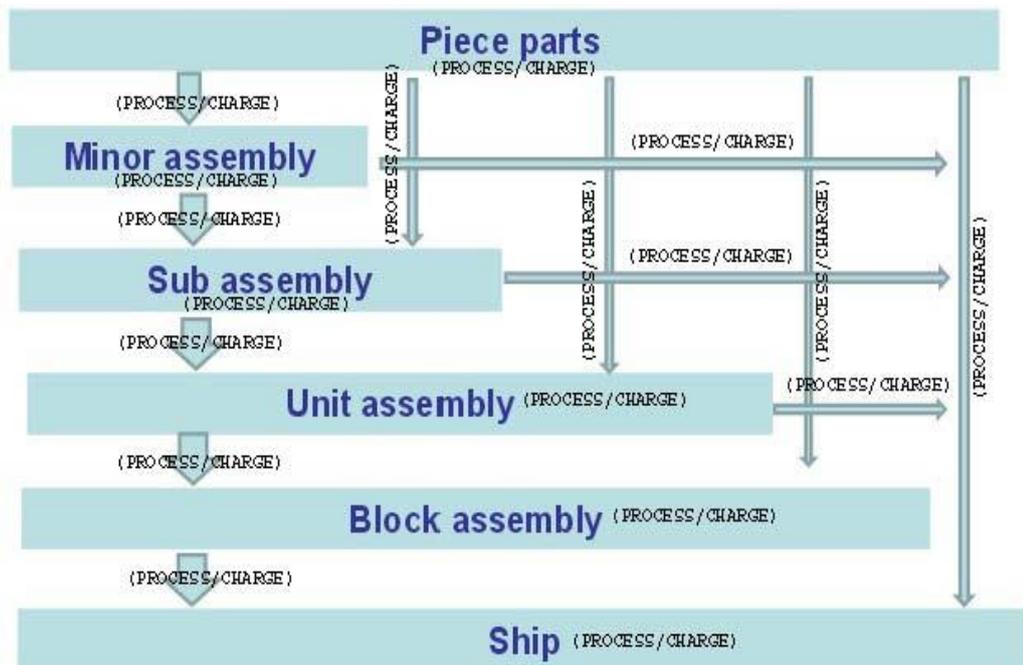
### 3.1 Identification of Each Process and Charge Item

Starting with the piece parts, each level in the build strategy is considered as a process. Since the material and/or labor costs are involved in every process, every process needs to be considered in cost estimating. In other words, material cost and workers' time will be charged against that process.

The estimating process can be structured to follow the build strategy sequence so that the estimated man-hours represent the planned work sequence in the fabrication facility.

As the material cost and work time are captured for every process, the cost estimate can be compared to the actual values. As a result, processes will be evaluated and efficiency will be improved.

An overview of where these charge items are applicable and the focus of estimating effort in different levels of ship building process is shown in Figure 3.8.



**Figure 3.8:** Process or charge involvement

Plate parts and stiffeners can be organized in the piece parts level.

For the plate parts, the process is started with bringing the stock plate to the cutting table. Required time to cut the parts and etch the part names onto the cut parts is considered a charge item.

If any of the parts needs to be beveled before they are sent to the assembly line, another charge item is introduced for transferring the part to the beveling station in the fabrication facility.

Some parts will need to be flanged to form web frames, girders, and flanged brackets. In that case, one more charge item needs to be included for transferring the parts to the flanging station in the fabrication facility.

For the profiles, the process is started with bringing the profile stock to the profile cutting station. Required time to cut the profiles to desired lengths and mark the part names onto the cut profiles is considered a charge item.

Profile end-cuts are prepared and added as another charge item to the estimate item list.

Minor assembly or panel stations can be positioned in several places in the fabrication facility. They do not have to follow the major assembly line logic. In that case, based on the assembly sequence, the already prepared piece parts, and profiles are transferred to the assigned minor assembly stations. Again, the transfer time from different preparation stations to the assembly stations is considered as charge item.

The process of fitting these parts and profiles, and welding them at the assembly station, needs to be counted as a charge item, as well.

A sub-assembly station is used to bring multiple minor assemblies, as well as the piece parts, as directed by the built strategy. In addition to the usual transfer times, at this level, the fit-up time and welding time for multiple minor assemblies and piece parts need to be included in the charge item list.

The unit assembly level is where the sub-assemblies, minor assemblies, and piece parts are grouped together in accordance with the build sequence. Again, the transfer times, fit-up and welding times are listed as charge items.

The block assembly level the previous unit assemblies, sub-assemblies, minor assemblies, and piece parts are brought together per the build strategy. The transfer times, fit-up and welding times are, again, counted as charge items.

Finally, the blocks are transferred to the vessel, fit-up and welded at the ship assembly stage. Any other loose piece parts, panels or assemblies are also brought into the vessel to support the installation of the block. The transfer times, fit-up and

welding times for all the items to support the block installation are included in the estimating effort.

### **3.2 Money Savings**

Expenses in ship construction may simply be grouped into two categories: material and labor.

Once the functional design is completed, reviewed and approved by a regulatory body, the structural design is basically locked up. Unless there is a change at a functional level, such as major changes in the propulsion plant, the addition of major deck equipment or modifications to the superstructure, the structural design does not have room for improvements after that point. Since there is normally no room in the fabrication schedule for design review and re-approval after the award of the contract, specified material in the functional design has to be purchased by the fabricators of the vessel. Small amounts of savings in material cost may be recognized after arduous efforts of the purchasing department in search of best material prices.

Labor costs, on the other hand, have more room to improve in terms of savings, if the fabrication processes are carefully measured and examined for the purpose of improving productivity. Improved productivity simply leads to less waste in material and fabrication time. Each has a direct effect on the bottom line.

Improved productivity will also be realized when the shipyard, or its sub-contractors, has the chance to integrate its standards into the production design, influencing the lofting and nesting process. Naturally, if these standards can be implemented during the functional design phase, lofting efforts after the contract award can be completed sooner. This leads to early steel cut and fabrication.

The estimation method in this thesis directly targets the labor hours and aims to provide a tool for collecting and examining the labor cost data.



#### **4. METRICS USED IN PRODUCTIVITY**

In this thesis, the term “metric” is used as the average time that is expected to be assigned for a specific task.

Each step in fabricating a minor assembly or panel, a sub-assembly, a unit assembly, a block assembly or module has a man-hour assignment. The specific metric value for each step represents a standard man-hour value that is appropriate for that particular shipyard or production facility.

The most important characteristic of the metric value is that it cannot be assigned one time and used for all shipyards. In other words, metric values are not generic, because each shipyard, or its sub-contractors, has a different fabrication process.

However, metric values can be adjusted after the actual production time is compared to the estimated man-hours to improve the accuracy of the estimate and examine the productivity trends of each work station between different blocks or projects.

These metric values are gathered from the participating shipyards and grouped in different MS Excel worksheets because of their different nature.

##### **4.1 Flat Plate Parts**

The flat plate parts represent various structural components such as deck plates, brackets, clips, pads, and flatbars. They are cut from a large piece of plate before they are further processed or directed to the assembly line for production.

Flat plates are addressed in the “Variables” worksheet with the following metric value(s). These metric values are obtained from participating shipyards in the form of a questionnaire as shown in Table 4.1. Shipyards are asked to provide data for the highlighted cells in Table 4.1.

- Plate cut time metric at the NC cutting machine (minutes per nest cut length).
- Plate mark time metric, either at the NC cutting machine or specific marking machine (minutes per nest mark length).

- Plate handling time to the beveling station metric, if beveling is required (minutes per weight range).
- Plate beveling time metric (minutes per thickness range per bevel length).
- Plate handling time to assembly station metric where plates will be joined before the profiles are added (minutes per weight range, either from beveling station or cutting station).
- Plate fit time at the assembly station metric (minutes per plate area range).
- Plate weld time metric based on the weld schedule (minutes per weld length per weld type).

**Table 4.1: Metric values for the flat plate parts questionnaire**

Flat Plate Parts Metric Questionnaire	minutes per unit length or weight	per 1st order (in), (lbs)
PL_Handle_Time_to_Cutting_Sta		na
PL_Cut_Time		per PLCut-Schedule
PL_Mark_Time		nest mark length (minutes per inch) (250 inches per minute)
PL_Handle_Time_to_Beveling_Sta (FOR t >= 0.375)		<= 50 LBS
PL_Handle_Time_to_Beveling_Sta (FOR t >= 0.375)		> 50 LBS
PL_Bevel_Time		FOR 0.375 <= t < 0.75
PL_Bevel_Time		FOR 0.75 <= t < 1.25
PL_Bevel_Time		FOR t >= 1.25
PL_Handle_Time_to_Assembly_Sta		FROM BEVELING STATION <= 50 LBS
PL_Handle_Time_to_Assembly_Sta		FROM BEVELING STATION > 50 LBS LBS
PL_Handle_Time_to_Assembly_Sta		FROM THE CUTTING STATION <= 50 LBS
PL_Handle_Time_to_Assembly_Sta		FROM THE CUTTING STATION > 50 LBS LBS
PL_Fit_Time		FOR AREA <= 36 SF (5184 sqin)
PL_Fit_Time		FOR 36 < AREA <= 400 SF (57,600 sqin)
PL_Fit_Time		FOR AREA > 400 SF
PL_Weld_Time		per weld schedule

The actual values of the flat plate part variables that are used in the calculations are shown in Appendix A.

Plate cut times that are used in the calculations are shown in Appendix B.

Welding times for the calculations are presented in Appendix G.

## 4.2 Profiles

The profile parts represent stiffeners such as angles, channels, I-beams, structural tubes, Tee shapes, bulb flats and, occasionally, flatbars. They are cut from a long

piece of purchased standard structural profiles before they are further processed or directed to the assembly line for production.

Profiles are addressed in the “Variables” worksheet with the following metric value(s). Shipyards are asked to provide these metric values for the highlighted cells in Table 4.2.

- Profile cutting time metric at the work station for profiles (minutes for each profile).
- Profile mark time metric for marking the name of the profile at the work station for profiles (minutes for each profile).
- Profile endcut time metric based on the endcut schedule (minutes per endcut).
- Profile handling time to assembly station metric where profiles will be laid out over the plates (minutes per weight range).
- Profile fit time at the assembly station metric (minutes per profile length range).
- Profile weld time metric based on the weld schedule (minutes per weld length per weld type).

The actual values of the profile variables used in the calculations are shown in Appendix C.

Profile endcut times used in the calculations are shown in Appendix D.

Welding times for the calculations are presented in Appendix G.

**Table 4.2: Metric values for the profiles questionnaire**

Profile Metric Questionnaire	minutes per unit length or weight	per 1st order (in), (lbs)
Stiff_Handle_Time_to_Endcut_Station		
Profile_Cut_Time		part quantity
Profile_Mark_Time		ONE PER PROFILE
Profile_EndCut_Time		per the EndCut_Schedule
Profile Handling to assembly station		FROM END-CUT STATION FOR WEIGHT <= 50 LBS
Profile Handling to assembly station		FROM END-CUT STATION FOR WEIGHT > 50 LBS LBS
Profile Handling to assembly station		FROM LENGTH CUTTING STATION FOR WEIGHT <= 50 LBS
Profile Handling to assembly station		FROM LENGTH CUTTING STATION FOR WEIGHT > 50 LBS LBS
Fit profile to plate		FOR Length <= 10 ft. (120 in.)
Fit profile to plate		10 ft. < Length <= 20 ft. (240 in.)
Fit profile to plate		Length > 20 ft.
Weld profile to plate		per weld schedule

### 4.3 Flanged Plate Parts

The flanged plate parts represent flanged brackets, flanged girders and web frames. They are cut from a large piece of plate before the flange is applied with a tool called the press brake and directed to the assembly line for production.

Flanged plates (girders, web frames or flanged brackets) are addressed in the “Variables” worksheet with the following metric value(s). These metric values are obtained from participating shipyards in the form of a questionnaire as shown in Table 4.3.

- Flanged plate time to flanging station metric for (minutes per weight range).
- Flanged plate time to apply the flange metric based on length of the flange (minutes per length range).
- Flanged plate handling time to assembly station metric (minutes per weight range).
- Flanged plate fit time at the assembly station metric where flanged plates will be laid out over the plates (minutes per profile length range).
- Flanged plate weld time metric based on the weld schedule (minutes per weld length per weld type).

**Table 4.3:** Metric values for the flanged plates questionnaire

Flanged Plate Metric Questionnaire	minutes per unit length or weight	per 1st order (in), (lbs)
Handle to cutting station / table		
Flanged Plate Cut Time		Covered under the Plate Nest Cut Length
Flanged Plate Mark Time		Covered under the nest mark length
FP Handle Time to Flanging Sta		<= 50 LBS
FP Handle Time to Flanging Sta		> 50 LBS
FP Flange Time		For Length <= 4 ft (48 in.)
FP Flange Time		4 ft. < Length <=10 ft. (120 in.)
FP Flange Time		Length >10 ft.
FP Handle Time to Assembly Sta after flanging		<= 50 LBS
FP Handle Time to Assembly Sta after flanging		> 50 LBS
Fit Flanged Plate to plate		For Length <= 4 ft (48 in.)
Fit Flanged Plate to plate		4 ft. < Length <=10 ft. (120 in.)
Fit Flanged Plate to plate		Length >10 ft.
Weld Flanged Plate to plate		per weld schedule

The actual values of the flanged plate part variables used in the calculations are shown in Appendix E.

Welding times for the calculations are presented in Appendix G.

#### 4.4 Panels

The panels represent various minor assemblies of flat plates, profiles, and flanged plates. They are already cut and prepared to fit together for forming a minor assembly before directed to the assembly line for production.

Joining panels are addressed in the “Variables” worksheet with the following metric value(s). Required data are provided by the participating shipyards as shown in Table 4.4.

The actual values of the panel variables used in the calculations are shown in Appendix F.

Welding times for the calculations are presented in Appendix G.

- Panel handling time to assembly station metric where panels will be joined (minutes per weight range or minutes per panel area range).
- Panel fit-up time at the assembly station metric (minutes per panel area range).
- Panel weld time metric based on the weld schedule (minutes per weld length per weld type).

**Table 4.4: Metric values for the panels questionnaire**

Panel Metric Questionnaire	minutes per unit length or weight	per 1st order (in), (lbs)
Panel_Handle_Time_to_Assembly_Sta		<= 50 LBS
Panel_Handle_Time_to_Assembly_Sta		> 50 LBS
Panel_Handle_Time_to_Assembly_Sta		FOR AREA <= 200 SF (28,800 sqin)
Panel_Handle_Time_to_Assembly_Sta		FOR 200 < AREA <= 400 SF (57,600 sqin)
Panel_Handle_Time_to_Assembly_Sta		FOR AREA > 400 SF
Panel_Fit-up Time		FOR WEIGHT <= 1000 pounds
Panel_Fit-up Time		FOR 1000 < WEIGHT <= 7500 pounds
Panel_Fit-up Time		FOR WEIGHT > 7500 pounds
Weld Panels together		per weld schedule

#### 4.5 Endcut Schedule

The endcut designations represent how the two ends of profiles need to be cut, trimmed, coped, etc. so that , later on in the assembly sequence, they fit in the assembled structure as intended.

Endcuts are normally modeled with the stiffeners in accordance with the functional design drawings. Endcut designations are extracted from the material attributes in the three-dimensional structural model.

Endcut time metric values for each endcut type are gathered from the participating shipyards in the form of a questionnaire as shown in Table 4.5.

The “EndCut\_Schedule” worksheet contains the following metric value(s) for cutting, trimming or coping the ends of a profile as required in the assembly drawings.

- Profile endcut time metric (minutes per endcut type).

**Table 4.5: Metric values for the endcuts questionnaire**

EndCut_Type Questionnaire	EndCut_Time_minute per end-cut
E_	
E_	
E_	
E_	
E_	
E_	

#### 4.6 Weld Schedule

The weld schedule is prepared to document the types of welds that are need to fabricate the assemblies and the time it takes to apply these welds based on the shipyard practices.

If the weld type designations are entered into the three-dimensional structural model, these designations can be extracted from the material attributes. However, if they are excluded from the model for some reason, they need to be manually entered in the “Variables” worksheet in accordance with the functional design drawings.

Weld time metric values for each weld type are gathered from the participating shipyard in Table 4.6.

**Table 4.6:** Metric values for the weld types questionnaire

Weld_Type Questionnaire	Weld_Time minutes per inch of weld
B L 1 G F 0.25	
T FLT na F F 0.125x2.5x10+4	
T FLT na F F 0.1875x2.5x12+3	
T FLT na F F 0.1875x2.5x10+4	
L FLT na F H 0.25	
L FLT na F H 0.1875	
T FLT na F H 0.1875	
T FLT na F F 0.125	
T FLT na F V 0.125	
T FLT na F V 0.1875	
T FLT na F V 0.25	
T FLT na F F 0.1875	

The Weld\_Type legend is as follows:

“Joint Type “\_”Penetration Type”\_”Weld Type\_”Welding Process”\_Welding Position”\_”Weld Size”

The legend for Joint Type is as follows:

B	Butt joint
C	Corner joint
T	Tee joint
L	Lapped joint

The legend for Penetration Type is as follows:

L	limited thickness, complete joint penetration
U	unlimited thickness, complete joint penetration
FLT	fillet

The legend for Weld Type is as follows:

na	not applicable due to fillet weld status
1	square groove
2	single V groove
3	double V groove
4	single bevel groove
5	double bevel groove
6	single U groove
7	double U groove
8	single J groove
9	double J groove
10	flare bevel groove

The legend for Welding Process is as follows:

G	gas metal arc welding
F	flux-cored arc welding
ST	shielded metal arc welding (stick)

The legend for Welding Position is as follows:

F	flat
H	horizontal
V	vertical
OH	overhead

For example, the “B\_L\_1\_G\_F\_” designation means that a complete penetration, square groove, butt weld to be administered to that weld seam with the gas metal arc welding process on a flat surface. It can also be broken down as follows:

- B for butt joint of how the parts come together.
- L for complete penetration, limited thickness, when the welding is done.
- 1 for square groove weld type to be employed.
- G for gas metal arc welding process to be used.
- F for flat welding position to be set.

The legend for Weld Size is as follows:

The first number represents the throat thickness in inches.

If the weld size has more description, other characters may be added to the throat thickness in the form of “Weld spacing + Length of continuous weld at ends” (e.g. 0.125x2.5x10+4 means that 2.5 inches of 0.125 inches thick throat are applied on 10-inch centers plus 4 inches of continuous weld of 0.125 inches thick throat at ends).



## **5. ALGORITHM**

The three-dimensional structural models and assembly drawings that are generated from these models may be developed with the aid of numerous software packages such as ShipConstructor by SSI, NUPAS Cadmatic, FORAN by Sener Marine, and many others.

The programming languages and databases in these software packages are not designed to communicate with the other modeling software packages for similar purposes. In other words, a structural model from one software package cannot be imported into another software package without significant issues. Most of the time, it is not possible at all. Because of this reason, modeling and assembly drawings need to be maintained within the software package that they are developed in.

Fortunately, they are all capable of exporting material properties, numerous attributes, and part parameters into MS Excel format, which is one of the most widely used software programs in the industry. Consequently, data collection for the estimating method can be independent of the software package that was used for modeling and assembly drawings.

In attempts to be globally applicable, the algorithm in this thesis is developed in MS Excel 2013 by using Visual Basic for Applications (VBA).

The structural model and associated assembly drawings that are developed in ShipConstructor software are used in developing the algorithm in this thesis.

The U07-U07.dwg refers to the name of the module or block in the ShipConstructor software structural modeling hierarchy.

## 5.1 Extracted Parameters

Parameters are the characteristics of each part that is needed to build a structural module or block. In addition to the physical characteristics, parameters provide process related information such as weld type, weld length, endcut, flanging and cut lengths, etc.

All parameters, regardless of which assembly level or step that they belong to, are extracted into one MS Excel worksheet. The worksheet is named with the name of the module in the ShipConstructor software structural modeling hierarchy.

Therefore, parameters for each block will be extracted into their own worksheet, but the same algorithm will be applicable to each module.

Each row in the worksheet is designated for a part that is also shown in the bill of materials table on the assembly drawings. The key parameters for every part that belongs to each assembly level are extracted from the ShipConstructor software as outlined below.

The key parameters for the flat place piece parts are listed in Table 5.1.

The parameters related to profiles are shown in Table 5.2.

Table 5.3 shows the extracted non-numeric values and their descriptions.

Tables 5.4 and 5.5 outline the parameters for the flanged plates and panels.

The extracted values are presented in Appendices K and N.

**Table 5.1:** Flat panel parameters

---

Assembly name that the plate belongs to.

---

Plate name.

---

Plate quantity.

---

Plate weight.

---

Plate nest cut length to be used in calculating the cutting time.

---

**Table 5.1 (continued): Flat panel parameters**

---

Plate nest mark length to be used in calculating the marking time.

---

Plate bevel length to be used in calculating the beveling time.

---

Plate area to be used in calculating the fit-up time at the assembly station.

---

Plate weld seam length.

---

Plate weld type for side 1 of the weld seam.

---

Plate weld type for side 2 of the weld seam.

---

**Table 5.2: Profile parameters**

---

Assembly name that the profile belongs to.

---

Profile name.

---

Profile quantity.

---

Profile weight.

---

Profile length to be used in calculating the cutting and fit-up time.

---

Profile endcut designation for one end.

---

Profile endcut designation for the other end.

---

Profile weld type for side 1 of the weld seam.

---

Profile weld type for side 2 of the weld seam.

---

Some of the extracted values are other than numbers. In that case, following legend can be used to describe these non-numeric values:

**Table 5.3:** Non-numeric extracted values

Empty Cells:	No value is present for VBA purposes
“N/A” in the Stock column:	This part has been processed previously
“N/A” in the EndCut columns:	The part is not a profile
“none” in the EndCut columns:	The part is a profile but no endcut is needed
“NTxxx” designation:	Shows which nest tape has that part
“N/A” in the Plate Nest Name column:	The part is not nestable
“True” in the Is Flanged column:	This is a plate part and needs to be flanged
“False” in the Is Flanged column:	This is a plate part but does not need to be flanged
“0” in the Weld Type columns:	This side of the part does not need to be welded

**Table 5.4:** Flanged plate parameters

Assembly name that the flanged plate belongs to.
Flanged plate quantity.
Flanged plate weight.
Flange length to be used in calculating the flanging and fit-up times.
Flanged plate weld type for side 1 of the weld seam.
Flanged plate weld type for side 2 of the weld seam.

**Table 5.5:** Panel plate parameters

---

Assembly name that the panel group belongs to
Panel name.
Panel quantity.
Panel weight.
Panel area to be used in calculating the fit-up time.
Panel weld type for side 1 of the weld seam.
Panel weld type for side 2 of the weld seam.

---

## 5.2 Method of Applying Metrics

All metrics are applied with basic MS Excel formulas, with their adapted styles in VBA.

Target cells with specific metric values in the “Variables” worksheet are referenced with \$\$\_ format.

The “Weld\_Schedule”, “PLCut\_Schedule” and “EndCut\_Schedule” worksheets are referenced with array and VLOOKUP functions.

When metrics are applied, results are compiled in a separate worksheet within the same workbook to keep the input and output values separate.

For each part name, VBA reads the extracted parametric values, matches them with the targeted metric values, and applies the formulas as described below. Meanwhile, the VBA keeps the same order of appearance for each part in the bill of material tables in the assembly drawings provided in Appendices J and M.

Appendix H provides a flow chart view of the VBA and how the values are related to the formulas below.

A sample of VBA code for the algorithm is presented in Appendix I.

### 5.2.1 Application of flat plate metrics

The application method is a long series of formulae in the VBA code. These formulae merge the previously extracted parameters with the metric values collected from the participating shipyards. The explanation of these formulas is presented below. Appendix I gives samples for how these formulae are converted into VBA code.

- Plate cut time = Plate nest cut length \* Plate quantity \* Plate cut time metric
  
- Plate mark time = Plate nest mark length \* Plate quantity \* Plate mark time metric
  
- If plate thickness  $\geq 0.375$  in. and plate bevel length is other than zero, the plate needs to be beveled, so it is taken to the beveling station:
  - Plate handling time to beveling station = Plate weight \* Plate quantity \* Plate handling time metric to the beveling station for weight  $\leq 50$  lbs.
  
  - or
  - Plate handling time to beveling station = Plate weight \* Plate quantity \* Plate handling time metric to the beveling station for weight  $> 50$  lbs.
  
- Bevel is applied:
  - Plate bevel time = Plate bevel length \* Plate quantity \* Plate beveling time metric for  $0.375 \text{ in.} \leq t < 0.75 \text{ in.}$
  
  - or
  - Plate bevel time = Plate bevel length \* Plate quantity \* Plate beveling time metric for  $0.75 \text{ in.} \leq t < 1.25 \text{ in.}$
  
  - or

- Plate bevel time = Plate bevel length \* Plate quantity \* Plate beveling time metric for  $t \geq 1.25$  in.
- After beveling, check to see if the plate needs to be flanged. If so, the plate is taken to the flanging station.
- If so, the plate is taken to the flanging station after beveling.
  - Plate handling time from beveling station to flanging station = Plate weight \* Plate quantity \* Plate handling time to flanging station from beveling station metric for weight  $\leq 50$  lbs.
  - or
  - Plate handling time from beveling station to flanging station = Plate weight \* Plate quantity \* Plate handling time to flanging station from beveling station metric for weight  $> 50$  lbs.
- If not, the plate is taken to the assembly station after beveling.
  - Plate handling time from beveling station to assembly station = Plate weight \* Plate quantity \* Plate handling time to assembly station from beveling station metric for weight  $\leq 50$  lbs.
  - or
  - Plate handling time from beveling station to assembly station = Plate weight \* Plate quantity \* Plate handling time to assembly station from beveling station metric for weight  $> 50$  lbs.
- If the plate does not need to be beveled, determine if the plate needs to be flanged.
- If so, the plate is taken to the flanging station.

- Plate handling time from cutting station to flanging station = Plate weight \* Plate quantity \* Plate handling time to flanging station from cutting station metric for weight  $\leq 50$  lbs.

or

- Plate handling time from cutting station to flanging station = Plate weight \* Plate quantity \* Plate handling time to flanging station from cutting station metric for weight  $> 50$  lbs.

- If not, it is taken directly to the assembly station:

- Plate handling time from cutting station to assembly station = Plate weight \* Plate quantity \* Plate handling time to assembly station from cutting station metric for weight  $\leq 50$  lbs.

or

- Plate handling time from cutting station to assembly station = Plate weight \* Plate quantity \* Plate handling time to assembly station from cutting station metric for weight  $> 50$  lbs.

- Plate fit-up time at the assembly station:

- Plate fit-up time = Plate area \* Plate quantity \* Plate fit-up metric for area  $\leq 36$  sf.

or

- Plate fit-up time = Plate area \* Plate quantity \* Plate fit-up metric for area  $36 \text{ sf.} < \text{area} \leq 400 \text{ sf.}$

or

- Plate fit-up time = Plate area \* Plate quantity \* Plate fit-up metric for area  $> 400 \text{ sf.}$

- Plate weld time for one side of the weld seam = Plate weld length \* Plate quantity \* Weld time metric for weld type side 1 in the “Weld\_Schedule” worksheet.
- Plate weld time for the other side of the weld seam = Plate weld length \* Plate quantity \* Weld time metric for weld type side 2 in the “Weld\_Schedule” worksheet.

### 5.2.2 Application of profile metrics

Similar to the flat plate formulae, the profile parameters are coupled with the extracted parameters in the VBA code as shown below. Appendix I gives samples for how these formulae are converted into VBA code.

- Profile cut time = Profile quantity \* Profile cut time metric for each profile.
- Profile mark time = Profile quantity \* Profile mark time metric for each profile.
- If endcuts need to be applied:
  - Profile endcut time for one end = Profile quantity \* Endcut time metric for endcut start in the “EndCut\_Schedule” worksheet.
  - Profile endcut time for the other end = Profile quantity \* Endcut time metric for endcut finish in the “EndCut\_Schedule” worksheet.
- The profile is taken to the assembly station after the endcuts are applied:
  - Profile handling time from endcut station to assembly station = Profile weight \* Profile quantity \* Profile handling time to assembly station from endcut station metric for weight <= 50 lbs.

or

- Profile handling time from endcut station to assembly station = Profile weight \* Profile quantity \* Profile handling time to assembly station from endcut station metric for weight > 50 lbs.
- If endcuts are not needed, the profile is taken directly to the assembly station:
  - Profile handling time from cutting station to assembly station = Profile weight \* Profile quantity \* Profile handling time to assembly station from cutting station metric for weight <= 50 lbs.
  - or
  - Profile handling time from cutting station to assembly station = Profile weight \* Profile quantity \* Profile handling time to assembly station from cutting station metric for weight > 50 lbs.
- Profile fit-up time at the assembly station:
  - Profile fit-up time = Profile length \* Profile quantity \* Profile fit-up metric for length <= 10 ft.
  - or
  - Profile fit-up time = Profile length \* Profile quantity \* Profile fit-up metric for length 10 ft. < length <= 20 ft.
  - or
  - Profile fit-up time = Profile length \* Profile quantity \* Profile fit-up metric for length > 20 ft.
- Profile weld time for one side of the weld seam = Profile weld length \* Profile quantity \* Weld time metric for weld type side 1 in the “Weld\_Schedule” worksheet.

- Profile weld time for the other side of the weld seam = Profile weld length \* Profile quantity \* Weld time metric for weld type side 2 in the “Weld\_Schedule” worksheet.

### 5.2.3 Application of flanged plate metrics

The flanged plate parameters are partially related to the flat plate parameters because they are, initially, cut as a flat plate and then formed into a flanged part. start their Therefore, the cutting and marking times are already addressed in the flat plate section. The unique formulae are applicable after the cutting and marking processes. The explanation of these formulas is presented below. Appendix I gives samples for how these formulae are converted into VBA code.

- Flanged plate cut time is included in the flat plate cutting section.
- Flanged plate mark time is included in the flat plate cutting section.
- After cutting and marking, the plate is taken to the flanging station:
  - Flanged plate handling time from cutting station to flanging station = Flanged plate weight \* Flanged plate quantity \* Flanged plate handling time to flanging station from cutting station metric for weight <= 50 lbs.
  - or
  - Flanged plate handling time from cutting station to flanging station = Flanged plate weight \* Flanged plate quantity \* Flanged plate handling time to flanging station from cutting station metric for weight > 50 lbs.
- Flange time at the flanging station:
  - Flange time = Flanged length \* Flange plate quantity \* Flanging metric for flanged length <= 4 ft.
  - or
  - Flange time = Flanged length \* Flange plate quantity \* Flanging metric for length 4 ft. <flanged length <= 10 ft.

or

- Flange time = Flanged length \* Flange plate quantity \* Flanging metric for flanged length >10 ft.

- After flange is applied, the flanged plate is taken to the assembly station:

- Flanged plate handling time from flanging station to assembly station = Flanged plate weight \* Flanged plate quantity \* Flanged plate handling time to assembly station from flanging station metric for weight <= 50 lbs.

or

- Flanged plate handling time from flanging station to assembly station = Flanged plate weight \* Flanged plate quantity \* Flanged plate handling time to assembly station from flanging station metric for weight > 50 lbs.

- Flanged plate fit-up time at the assembly station:

- Flanged plate fit-up time = Flanged length \* Flanged plate quantity \* Flanged plate fit-up metric for flanged length <= 4 ft.

or

- Flanged plate fit-up time = Flanged length \* Flanged plate quantity \* Flanged plate fit-up metric for length 4 ft. <flanged length <= 10 ft.

or

- Flanged plate fit-up time = Flanged length \* Flanged plate quantity \* Flanged plate fit-up metric for flanged length >10 ft.

- Flanged plate weld time for one side of the weld seam = Flanged plate weld length \* Flanged plate quantity \* Weld time metric for weld type side 1 in the “Weld\_Schedule” worksheet.

- Flanged plate weld time for the other side of the weld seam = Flanged plate weld length \* Flanged plate quantity \* Weld time metric for weld type side 2 in the “Weld\_Schedule” worksheet.

#### 5.2.4 Application of panel metrics

The panel fabrication process is covered in the flat plate, profile and flanged plate applications above. At this stage, the panels are brought together and welded. The algorithm is structured to evaluate panels either by their weights or their physical sizes and the welding time.

The description of the formulas is presented below. Appendix I gives samples for how these formulae are converted into VBA code.

- Panels are taken from their storage locations in the yard to panel assembly station:
  - Panel handling time to assembly station = Panel weight \* Panel quantity \* Panel handling time to assembly station metric for weight <= 50 lbs.  
or
  - Panel handling time to assembly station = Panel weight \* Panel quantity \* Panel handling time to assembly station metric for weight > 50 lbs.  
or
  - Panel handling time to assembly station = Panel area \* Panel quantity \* Panel handling time to assembly station metric for area <= 200 SF.  
or
  - Panel handling time to assembly station = Panel area \* Panel quantity \* Panel handling time to assembly station metric for area 200 SF. < area <= 400 SF.  
or
  - Panel handling time to assembly station = Panel area \* Panel quantity \* Panel handling time to assembly station metric for area > 400 SF.

- Panel fit-up time at the assembly station:
  - Panel fit-up time = Panel area \* Panel quantity \* Panel plate fit-up metric for area  $\leq 200$  SF.
  - or
  - Panel fit-up time = Panel area \* Panel quantity \* Panel plate fit-up metric for area  $200 \text{ SF} < \text{area} \leq 400 \text{ SF}$ .
  - or
  - Panel fit-up time = Panel area \* Panel quantity \* Panel plate fit-up metric for area  $> 400$  SF.
  
- Panel weld time for one side of the weld seam = Panel weld length \* Panel quantity \* Weld time metric for weld type side 1 in the “Weld\_Schedule” worksheet.
  
- Panel weld time for the other side of the weld seam = Panel weld length \* Panel quantity \* Weld time metric for weld type side 2 in the “Weld\_Schedule” worksheet.

### 5.3 Output Format

The output format is presented in Microsoft Excel because it is widely used by cost estimators in shipyards, worldwide. Additionally, results can easily be copied and pasted into other worksheets or software for further studies.

There are 27 processes or workstations considered in the VBA algorithm for the two case studies.

The man-hour values for individual processes and charge items are presented in minutes to show the time in a meaningful way for small tasks. The calculated total man-hour value for each item on the Bill of Material table is presented in hours because it is the time format that shipyard estimators want to work with.

If a process or charge item is not applicable for a part, such as a plate cutting time for a profile, the calculated time is shown as empty cells to represent the zero value.

Starting with the assembly name, part name and part quantity for each item that is included in the block, a long list of calculated man-hour values is provided for the processes and /or charge items as listed in Table 5.6.

The output format is also presented in Appendices L and O with the results.

**Table 5.6:** Description of output values

<b>Description</b>	<b>Name as Listed in the Output Format</b>
Assembly name for the part	Assy Name
Part name as shown on the Bill of Material table	Part Name
Part quantity	Qty
Total calculated man-hour value per part	Total_mhr_per_Part
Calculated cutting time for a plate in minutes	PL_Cut_Time (min.)
Calculated marking time a plate in minutes	PL_Mark_Time (min.)
Calculated time to move the plate from the cutting table to the beveling station in minutes	PL_Handle_Time_to_Beveling_Sta (min.)
Calculated beveling time for a plate in minutes	PL_Bevel_Time (min.)
Calculated time to move the plate from the beveling station OR from the cutting table to the assembly station in minutes	PL_Handle_Time_to_Assy_Sta (min.)
Calculated fit-up time for the plate in minutes	PL_Fit_Time (min.)

**Table 5.6 (continued):** Description of output values

Calculated time to weld one side of the plate at the assembly station in minutes	PL_Weld_Time_Side_1 (min.)
Calculated time to weld the other side of the plate at the assembly station in minutes	PL_Weld_Time_Side_2 (min.)
Calculated cutting time for a profile in minutes	Profile_Cut_Time (min.)
Calculated marking time for a profile in minutes	Profile_Mark_Time (min.)
Calculated time to prepare the one end of the profile in minutes	EndCut_Time_Start_Time (min.)
Calculated time to prepare the other end of the profile in minutes	EndCut_Time_Finish_Time (min.)
Calculated time to bring the prepared profile to the assembly station in minutes	Profile_Handle_Time_to_Assy_Sta (min.)
Calculated fit-up time for the profile in minutes	Profile_Fit_Time (min.)
Calculated time to weld one side of the profile at the assembly station in minutes	Profile_Weld_Time_Side_1 (min.)
Calculated time to weld the other side of the profile at the assembly station in minutes	Profile_Weld_Time_Side_2 (min.)
Calculated time to move the plate from the cutting table to the flanging station in minutes	FP_Handle_Time_to_Flanging_Sta (min.)
Calculated flanging time for a plate in minutes	Flange_Time (min.)
Calculated time to move the flanged plate from the flanging station to the assembly station in minutes	FP_Handle_Time_to_Assembly_Sta (min.)

**Table 5.6 (continued):** Description of output values

Calculated fit-up time for the flanged plate in minutes	FP_Fit_Time (min.)
Calculated time to weld one side of the flanged plate at the assembly station in minutes	FP_Weld_Time_Side_1 (min.)
Calculated time to weld the other side of the flanged plate at the assembly station in minutes	FP_Weld_Time_Side_2 (min.)
Calculated time to move the minor-assembly (panel) to a higher level of assembly station in minutes	Panel_Handle_Time_to_Assembly_Sta (min.)
Calculated fit-up time for the minor-assembly (panel) in minutes	Panel_Fitup_Time (min.)
Calculated time to weld one side of the panel at the assembly station in minutes	Panel_Weld_Time_Side_1 (min.)
Calculated time to weld the other side of the panel at the assembly station in minutes	Panel_Weld_Time_Side_2 (min.)
Calculated time to move the plate from the beveling station to the flanging station	PL_Handle_Time_from_Bevel_Station_to_Flanging_Sta (min.)



## **6. CASE STUDY 1 – MODULE 07 STEEL FABRICATION ESTIMATE**

Module 07 is a large part of a superstructure for a river towboat. The estimated man-hour values will be comparable to the module that is next to it, because of its similarity in construction. Both modules belong to the superstructure of a river towboat. They both consist of flat and square panels.

The same reason does not apply to the hull modules as they differ from each other in hull form and internal arrangement.

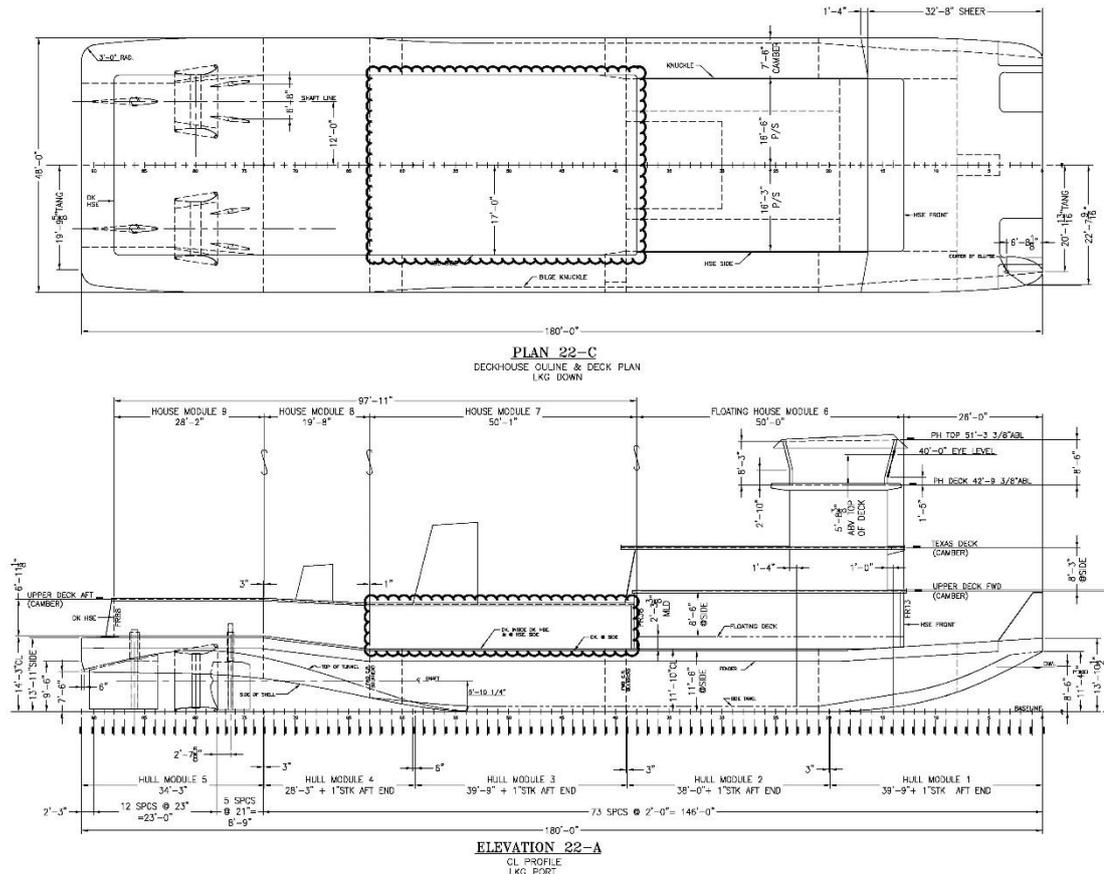
Boundaries of Module 07 are outlined in Figure 6.1.

The majority of parameters for the piece parts and assemblies are extracted from the 3-dimensional structural model in Microsoft Excel format through ShipConstructor software. The structural assembly drawings are available to study and add missing parameters.

The extracted parameters for each assembly level and part name are provided in Appendix K.

Assembly drawings are provided in Appendix J.

There are 413 individual parts in this module. Total weight of the module is 62,065.62 pounds.



**Figure 6.1: Boundaries of Module 07**

The participating shipyards provided the metric values for every process or charge item.

The VBA code is run to merge the extracted parameters and the metric values.

Estimated man-hour values for each process or charge item are provided in detail in Appendix L.

## **7. CASE STUDY 2 – MODULE 08 STEEL FABRICATION ESTIMATE**

Module 08 is a small part of a superstructure for a river towboat. It belongs to the same towboat as described in Case Study 1. It is smaller in comparison to Module 07 but has similar structural characteristics. Therefore, the results will be comparable to Module 07.

The majority of parameters for the piece parts and assemblies are extracted from the 3-dimensional structural model in Microsoft Excel format through ShipConstructor software. The structural assembly drawings are available to study and add missing parameters.

Boundaries of Module 08 are outlined in Figure 7.1.

The extracted parameters for each assembly level and part name are provided in Appendix N.

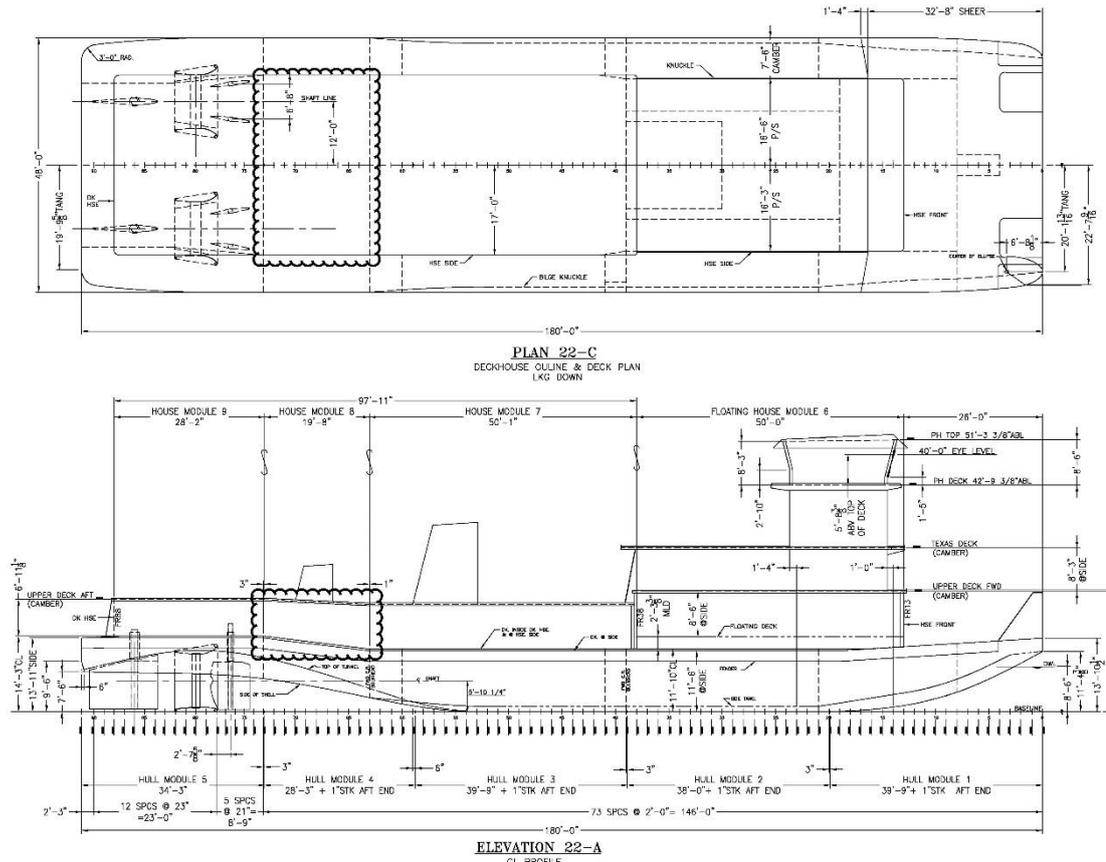
Assembly drawings are presented in Appendix M.

There are 174 individual parts in this module. Total weight of the module is 19,647.07 pounds.

The participating shipyards provided the metric values for every process or charge item.

The VBA code is run to merge the extracted parameters and the metric values.

Estimated man-hour values for each process or charge item are provided in detail in Appendix O.



**Figure 7.1: Boundaries of Module 08**

## **8. CONCLUSION AND RECOMMENDATIONS**

The intent of this thesis is to provide a computer-based cost estimating method to improve the accuracy of the current manual methods, which omit the complexity of the structural design of a vessel and the capabilities of the fabrication facility. In order to address these complex variables in the estimating process, a VBA algorithm is introduced in this thesis. This VBA algorithm combines the capabilities of the fabrication facility and detailed design aspects of the structure.

All the design related details for the two modules presented in the case studies are available in their 3-dimensional computer models. The key characteristics of each part needed for the VBA algorithm are extracted from these computer models as explained earlier. Because the 3-dimensional computer models have become a normal part of ship design practice in recent years, this VBA method is not limited to these two case studies.

As for the capabilities of the fabrication facility, the assembly sequence of these modules is further broken down to individual work items such as cutting, marking, beveling, etc. These steps are listed in a questionnaire, and participating shipyards are asked to provide the anticipated man-hour values for each work item.

These man-hour values are applied to the work items for each piece part and assembly in accordance with the build sequence. Hence, the capabilities of the fabrication facility and detailed design aspects are combined in the VBA algorithm.

The results obtained with the VBA algorithm simply show the estimated man-hour relationship between the two modules when the same metric values are applied based on the build strategy.

The calculated man-hour value for fabrication of the structural parts for Module 07 is approximately 580 hours and for Module 08 is approximately 214 hours. In other words, the calculated man-hour value for Module 08 is 37% of Module 07.

On the other hand, Module 08 weighs only 32% of Module 07. Hence, a weight-based estimating method is expected to produce a man-hour value for Module 08 is 32% of Module 07.

The 5% difference between the outputs of the two methods emphasizes the point that traditional weight-based estimating methods do not address the complexity of design, build strategy characteristics or the shipyard related metrics as much as the VBA algorithm.

The 5% difference between the two approaches is only for relatively simple, flat and square superstructure blocks. The gap may be wider when the two methods are applied to more complex hull structures, such as the bow or stern. The resulting miscalculation may be the difference between a successful project and lost profits.

Additionally, the VBA method and the format of the output allow the estimator to examine the calculated man-hours for each process or workstation in the shipyard. There are 27 processes or workstations considered in the VBA algorithm for this thesis.

Two of these processes appear to consume the most time between the two case studies:

The panel fit-up process consumes 31% of calculated total man-hours.

The plate fit-up process consumes 29% of calculated total man-hours.

Consequently, these two processes may be further examined for time saving procedures and technologies to reduce the “fit-up” time. The savings will directly relate to the bottom line.

Finally, it takes less than a minute to run the VBA code and obtain the results for both modules with an ordinary laptop computer. An experienced estimator will need a few hours per module to obtain similar results, as suggested by the participating shipyards.

Including the shipyard related parameters in estimation methods will result in selecting just the right size panels and assemblies that fit the capabilities of the shipyard before the fabrication is started. Matching the magnitude of work to the capabilities of the shipyard will introduce a higher level of accuracy and confidence in man-hour estimates. The work planning and budgeting tasks will gain a more

realistic, mathematical tool that will free-up the structural estimators and shipyard executives from man-hour and budget estimates. These experienced professionals may be utilized in workstation efficiency studies and improvements.

Please note that establishing the anticipated time frame to fabricate these modules is not the focus of this thesis. It is impossible to accomplish such a task, because shipyards will have different fabrication practices, production layouts, technologies, and organizations. The estimating methods need to be customized for each shipyard contrary to the traditional weight-based approaches. This VBA method is flexible enough to be customized for different shipyards and different build strategies. It was, however, developed with the production layout of the participating shipyards in mind. If this method is expanded for use in other shipyards, the production practices of those shipyards should be studied and incorporated into the VBA algorithm.

This VBA method may be enhanced with these features in the future:

- Introduction of rolled plate metrics will allow this method to accommodate complex hull forms and structures.
- Addition of lift and turn metrics for blocks will allow this method to join two or more blocks or large modules.
- Development of an interface module for the VBA algorithm may allow shipyards to enter their metric values and merge these values with their build strategies. This may allow shipyards to have local control over the estimating process while keeping estimating information confidential.
- Expansion of the algorithm for the pipe spool drawings will allow this method to cover the outfitting items in ship production.



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## **APPENDICES**

**APPENDIX A : VARIABLE WORKSHEET FOR FLAT PLATE PARTS**

**APPENDIX B : PLATE CUT SCHEDULE**

**APPENDIX C : VARIABLE WORKSHEET FOR PROFILES**

**APPENDIX D : PROFILE ENDCUT SCHEDULE**

**APPENDIX E : VARIABLE WORKSHEET FOR FLANGED PLATES**

**APPENDIX F : VARIABLE WORKSHEET FOR FLANGED PANELS**

**APPENDIX G : WELD SCHEDULE**

**APPENDIX H : FLOWCHART OF THE ALGORITHM**

**APPENDIX I : SAMPLE VBA CODE OF THE ALGORITHM**

**APPENDIX J : ASSEMBLY DRAWINGS FOR MODULE 07**

**APPENDIX K : EXTRACTED PARAMETER FOR MODULE 07**

**APPENDIX L : VBA RESULTS FOR MODULE 07**

**APPENDIX M : ASSEMBLY DRAWINGS FOR MODULE 08**

**APPENDIX N : EXTRACTED PARAMETER FOR MODULE 08**

**APPENDIX O : VBA RESULTS FOR MODULE 08**

**APPENDIX P : ADDITIONAL REFERENCE MATERIAL**



**APPENDIX A**

<b>Plate</b>	<b>minutes</b>	<b>per 1st order</b>	<b>per 2nd order</b>
		<b>(in), (lbs)</b>	
PL_Handle _Time_to_Cutting_Station	na	na	
PL_Cut_Time	na	per PLCut-Schedule	
PL_Mark_Time	0.00400	nest mark length (minutes per inch) (250 inches per minute)	
PL_Handle_Time_to_Beveling_Station (FOR t >= 0.375)	2.00	<= 50 LBS	weight
PL_Handle_Time_to_Beveling_Station (FOR t >= 0.375)	4.00	> 50 LBS	weight
PL_Bevel_Time	0.0127	FOR 0.375 <= t < 0.75	per bevel linear inch
PL_Bevel_Time	0.0379	FOR 0.75 <= t < 1.25	per bevel linear inch

<b>Plate</b>	<b>minutes</b>	<b>per 1st order</b>	<b>per 2nd order</b>
PL_Bevel_Time	0.0500	FOR t >= 1.25	per bevel linear inch
PL_Handle_Time_to_ Assembly_Sta	2.00	FROM BEVELING STATION <= 50 LBS	per piece
PL_Handle_Time_to_ Assembly_Sta	4.00	FROM BEVELING STATION > 50 LBS LBS	per piece
PL_Handle_Time_to_ Assembly_Sta	2.00	FROM THE CUTTING STATION <= 50 LBS	per piece
PL_Handle_Time_to_ Assembly_Sta	4.00	FROM THE CUTTING STATION > 50 LBS LBS	per piece
PL_Fit_Time	70	FOR AREA <= 36 SF (5184 sqin)	per sqin, SMALL PL
PL_Fit_Time	180	FOR 36 < AREA <= 400 SF (57,600 sqin)	per sqin, MEDIU M PL

<b>Plate</b>	<b>minutes</b>	<b>per 1st order</b>	<b>per 2nd order</b>
PL_Fit_Time	420	FOR AREA > 400 SF	per sqin, LARGE PL
PL_Weld_Time	na	per weld schedule	lin. Inch



**APPENDIX B**

<b>PL_Thickness (inch)</b>	<b>Cutting Speed (inch per minute)</b>
0	0.00001
0.1875	230.00
0.2500	200.00
0.3125	175.00
0.3750	140.00
0.5000	115.00
0.6250	80.00
0.7500	65.00
1.0000	45.00
1.2500	30.00
1.5000	20.00
2.0000	10.00



**APPENDIX C**

<b>Profile</b>	<b>minutes</b>	<b>per 1st order</b>	<b>per 2nd order</b>
Stiff_Handle _Time_to_Endcut_ Station	na		
Profile_Cut_Time	2.00	part quantity	per profile
Profile_Mark_Time	0.50	ONE PER PROFILE	per profile
Profile_EndCut_Time	2.00	per the EndCut_Schedule	per end-cut
Profile Handling to assembly station	4.00	FROM END-CUT STATION FOR WEIGHT <= 50 LBS	per profile
Profile Handling to assembly station	8.00	FROM END-CUT STATION FOR WEIGHT > 50 LBS LBS	per profile
Profile Handling to assembly station	4.00	FROM LENGTH CUTTING STATION FOR WEIGHT <= 50 LBS	per profile

<b>Profile</b>	<b>minutes</b>	<b>per 1st order</b>	<b>per 2nd order</b>
Profile Handling to assembly station	8.00	FROM LENGTH CUTTING STATION FOR WEIGHT > 50 LBS LBS	per profile
Fit profile to plate	5.00	FOR Length <= 10 ft. (120 in.)	per profile
Fit profile to plate	9.00	10 ft. < Length <= 20 ft. (240 in.)	per profile
Fit profile to plate	12.00	Length > 20 ft.	per profile
Weld profile to plate	na	per weld schedule	

**APPENDIX D**

<b>EndCut_Type</b>	<b>EndCut_Time_minute per end-cut</b>
E002	5
E013	5
E014	5
E020	5
E042	5
E079	5
STAIR	10



**APPENDIX E**

<b>Flanged Plate</b>	<b>minutes</b>	<b>per 1st order</b>	<b>per 2nd order</b>
Handle to cutting station / table	na		
Flanged_Plate_Cut_Time	na	Covered under the Plate Nest Cut Length	
Flanged_Plate_Mark_Time	na	Covered under the nest mark length	
FP_Handle_Time_to_Flanging_Sta (FROM Cutting Sta)	2	<= 50 LBS	per piece
FP_Handle_Time_to_Flanging_Sta (FROM Cutting Sta)	4	> 50 LBS	per piece
FP_Handle_Time_to_Flanging_Sta (FROM Beveling Sta)	4	<= 50 LBS	per piece
FP_Handle_Time_to_Flanging_Sta (FROM Beveling Sta)	8	> 50 LBS	per piece

<b>Flanged Plate</b>	<b>minutes</b>	<b>per 1st order</b>	<b>per 2nd order</b>
FP_Flange_Time	2	For Length <= 4 ft (48 in.)	flange length
FP_Flange_Time	5	4 ft. < Length <=10 ft. (120 in.)	flange length
FP_Flange_Time	10	Length >10 ft.	flange length
FP_Handle_Time_to_Assembly_Sta_after flanging	2	<= 50 LBS	per piece
FP_Handle_Time_to_Assembly_Sta_after flanging	4	> 50 LBS	per piece
Fit Flanged Plate to plate	15	For Length <= 4 ft (48 in.)	per piece
Fit Flanged Plate to plate	20	4 ft. < Length <=10 ft. (120 in.)	per piece

<b>Flanged Plate</b>	<b>minutes</b>	<b>per 1st order</b>	<b>per 2nd order</b>
Fit Flanged Plate to plate	25	Length >10 ft.	per piece
Weld Flanged Plate to plate	na	per weld schedule	



**APPENDIX F**

<b>Panel</b>	<b>minutes</b>	<b>per 1st order</b>	<b>per 2nd order</b>
Panel_Handle_Time_to_Assembly_Sta	2	<= 50 LBS	per panel
Panel_Handle_Time_to_Assembly_Sta	15	> 50 LBS	per panel
Panel_Handle_Time_to_Assembly_Sta	10	FOR AREA <= 200 SF (28,800 sqin)	SMALL Panel, sqin
Panel_Handle_Time_to_Assembly_Sta	12	FOR 200 < AREA <= 400 SF (57,600 sqin)	MEDIUM Panel, sqin
Panel_Handle_Time_to_Assembly_Sta	14	FOR AREA > 400 SF	LARGE Panel, sqin
Panel_Fit-up Time	180	FOR WEIGHT <= 1000 pounds	SMALL Panel, pounds
Panel_Fit-up Time	240	FOR 1000 < WEIGHT <= 7500 pounds	MEDIUM Panel, pounds
Panel_Fit-up Time	300	FOR WEIGHT > 7500 pounds	LARGE Panel, pounds
Weld Panels together	na	per weld schedule	

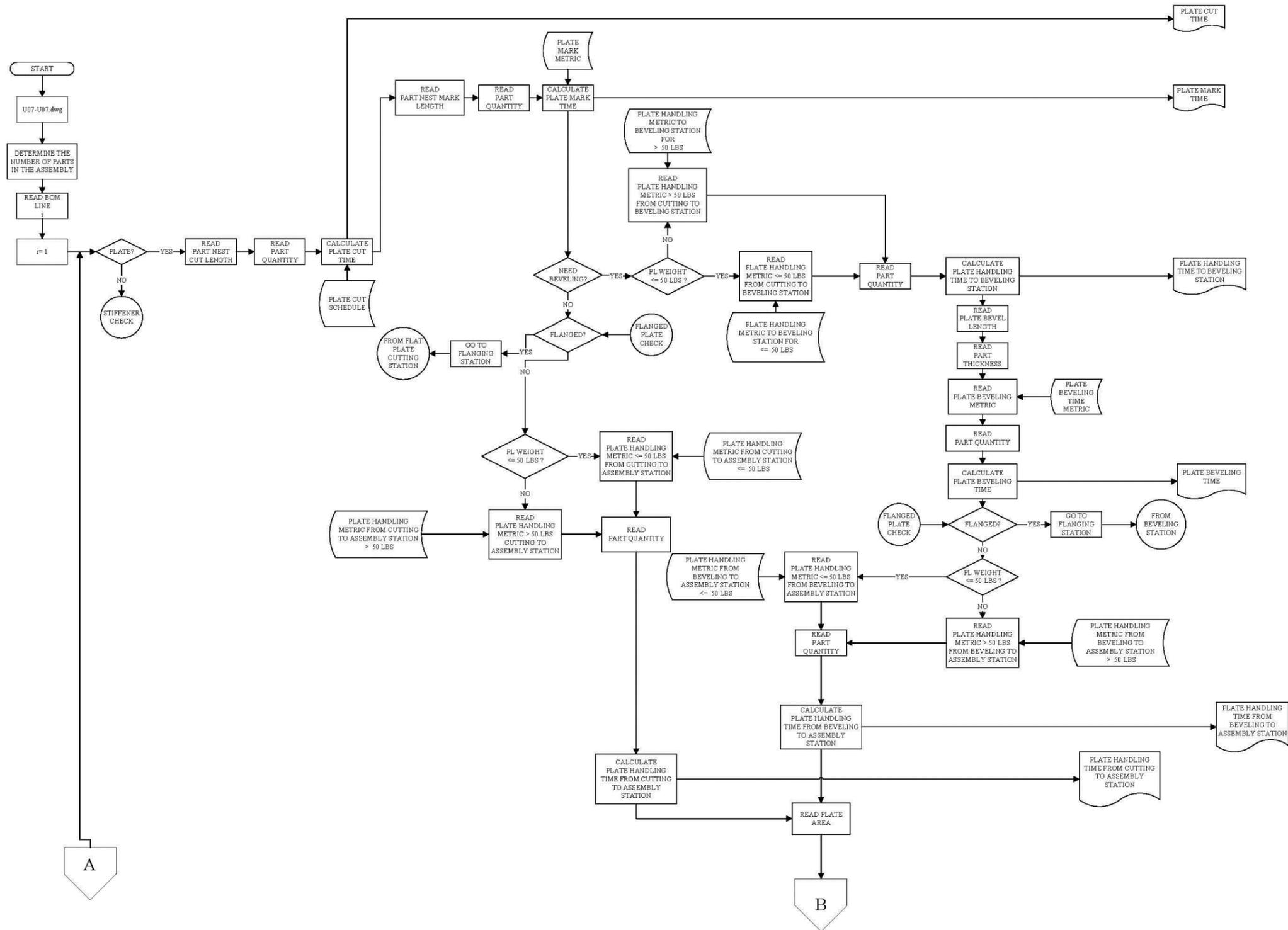


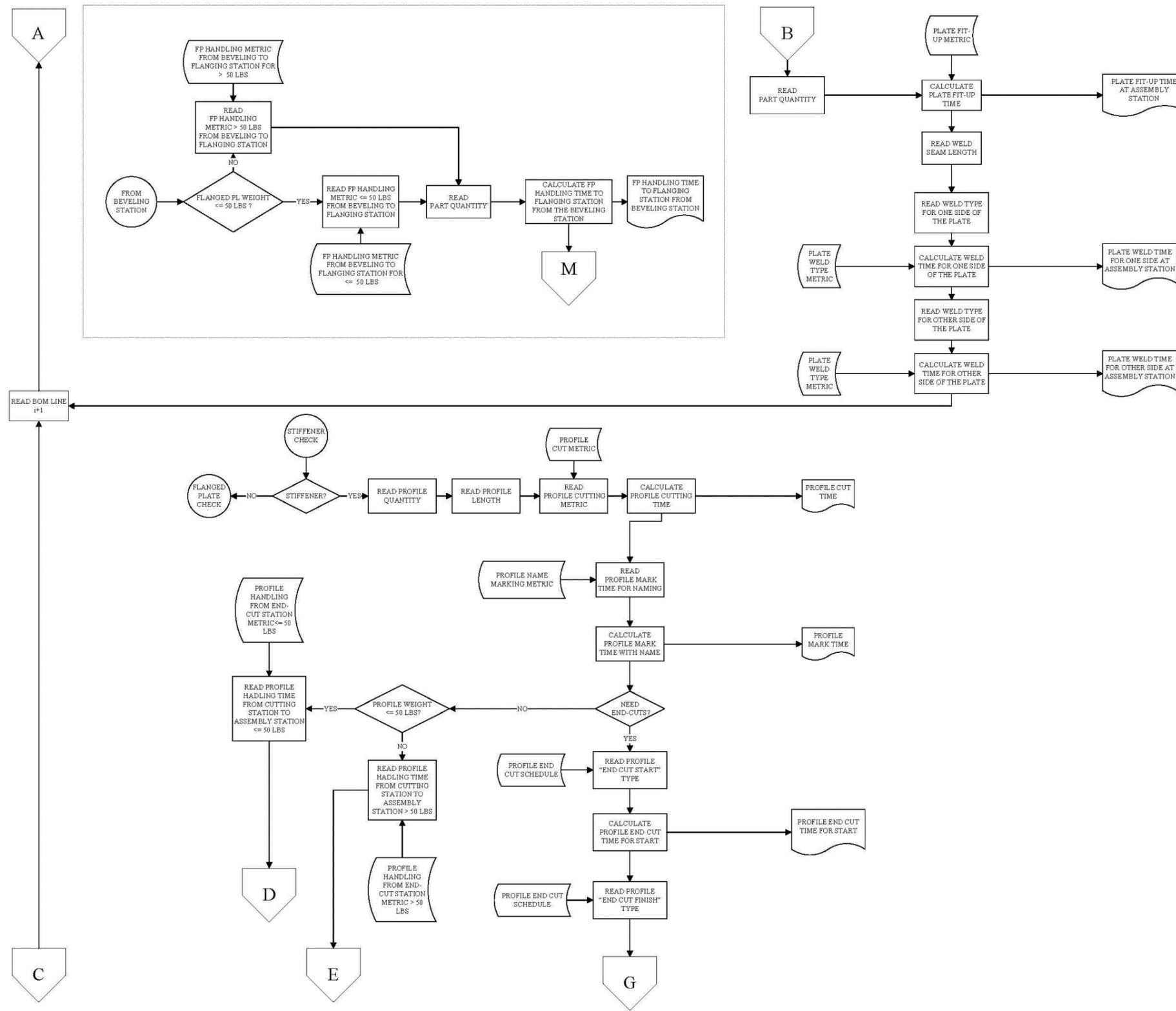
**APPENDIX G**

<b>Weld_Type</b>	<b>Weld_Time_minutes per inch of weld</b>
B_L_1_G_F_0.25	0.0508
T_FLT_na_F_F_0.125x2.5x10+4	0.1270
T_FLT_na_F_F_0.1875x2.5x12+3	0.0770
T_FLT_na_F_F_0.1875x2.5x10+4	0.1270
L_FLT_na_F_H_0.25	0.1693
L_FLT_na_F_H_0.1875	0.1693
T_FLT_na_F_H_0.1875	0.1693
T_FLT_na_F_F_0.125	0.1270
T_FLT_na_F_V_0.125	0.2540
T_FLT_na_F_V_0.1875	0.2540
T_FLT_na_F_V_0.25	0.2540
T_FLT_na_F_F_0.1875	0.1270
0	0

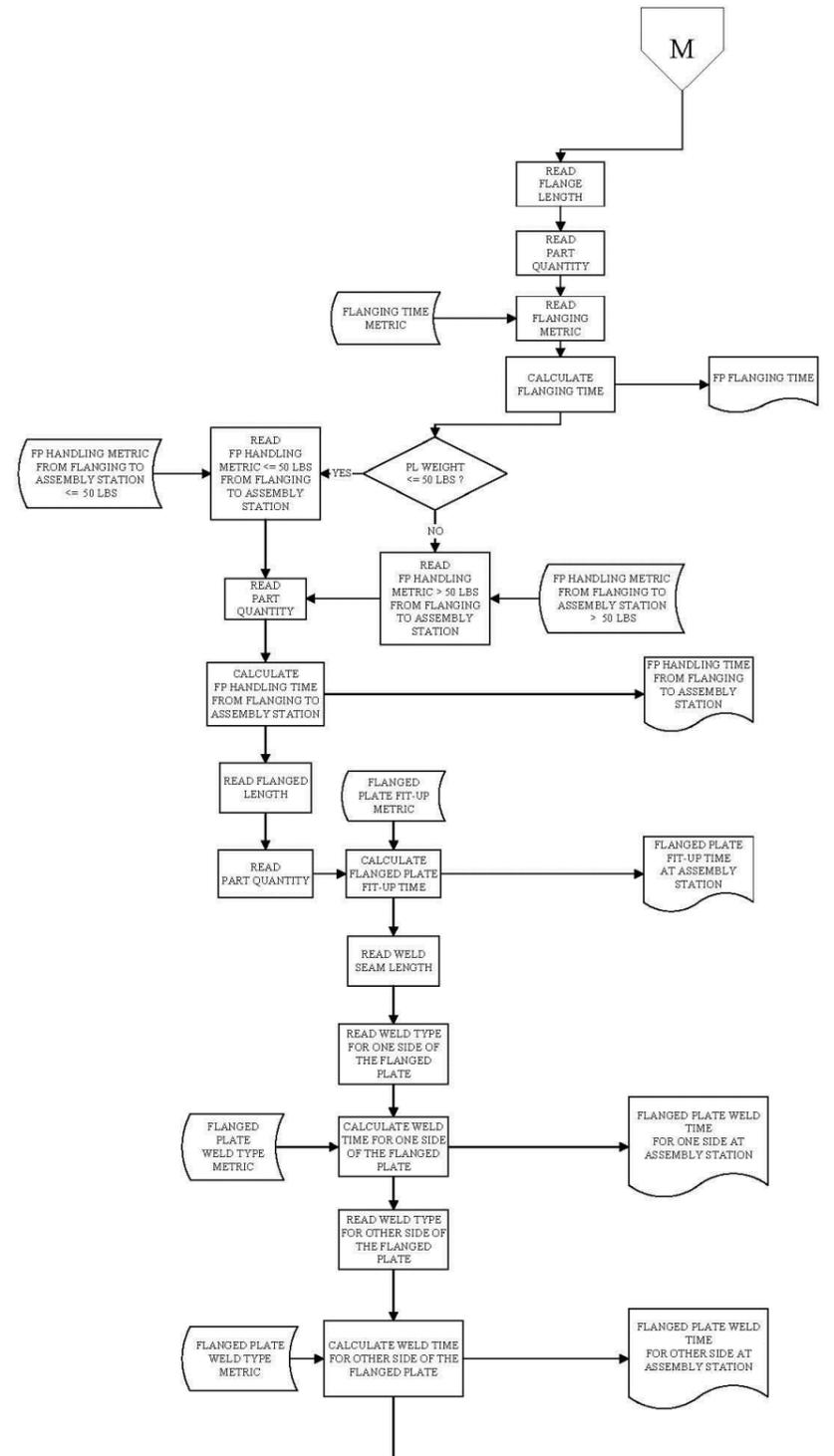
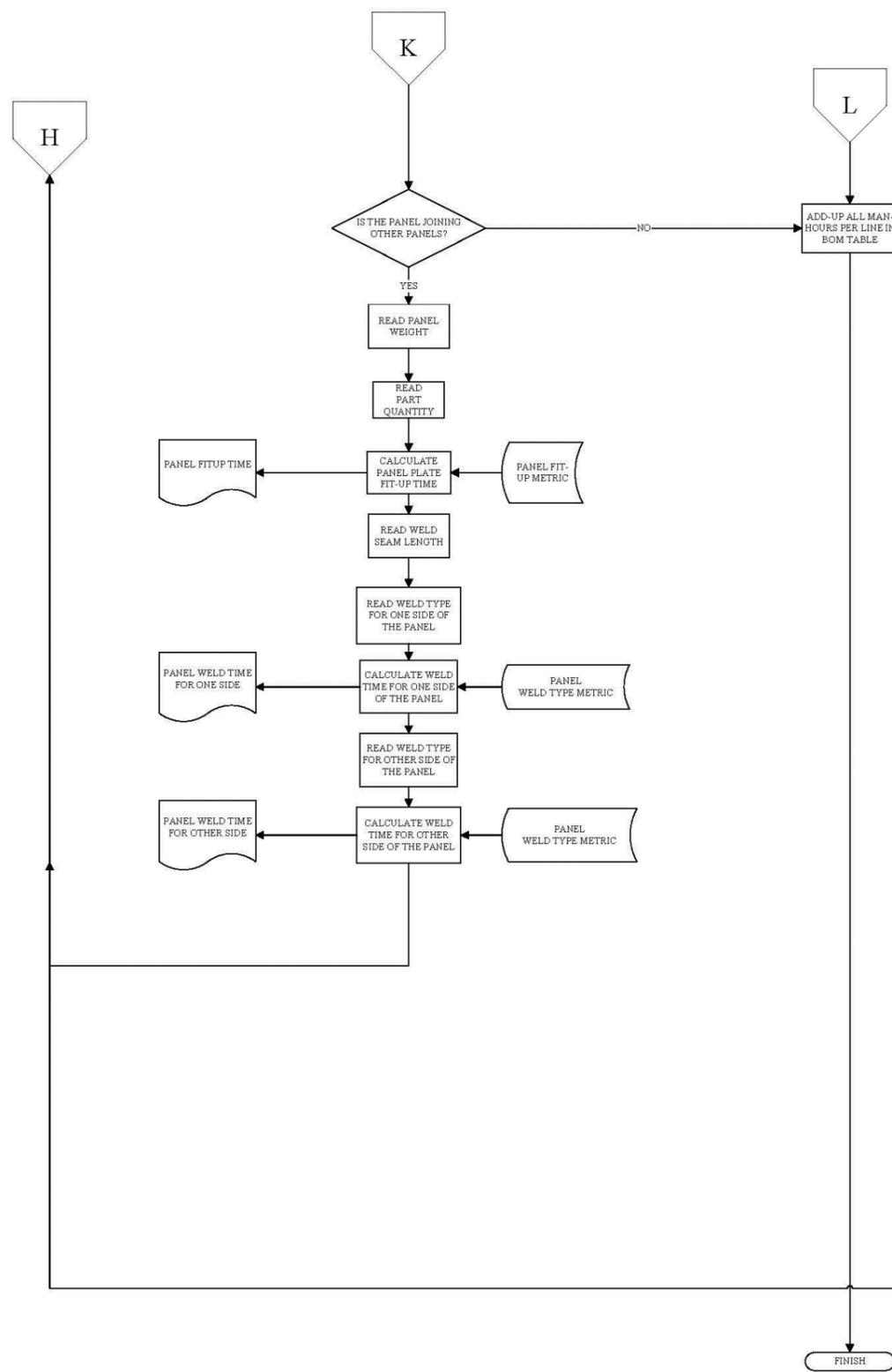


**APPENDIX H**











## APPENDIX I

```
Sub Define_Variables()
```

```
,
```

```
'Define Variable Types for Plate Parts
```

```
,
```

```
Dim PL_Handle_Time_to_Cutting_Sta As Byte
```

```
Dim PL_Cut_Metric As Byte
```

```
Dim PL_Cut_Time As Byte
```

```
Dim PL_Mark_Time As Byte
```

```
Dim PL_Handle_Time_to_Beveling_Sta As Byte
```

```
Dim PL_Bevel_Time As Byte
```

```
Dim PL_Handle_Time_to_Assembly_Sta As Byte
```

```
Dim PL_Fit_Time As Byte
```

```
Dim PL_Weld_Time As Byte
```

```
,
```

```
' Define Variable Types for Stiffener Parts
```

```
End Sub
```

```
Sub List_Assy_Names()
```

```
,
```

```
' List_Assy_Names
```

```
' Copies Assembly Names in 1st Column
```

```
,
```

```

Dim first_col As Range, cell As Range

Dim row As Integer

Sheets("U07-U07_for_vba").Select

ActiveWindow.Panes(1).Activate

Columns("B:B").Select

Selection.Copy

Sheets("vba_exec").Select

Columns("A:A").Select

ActiveSheet.Paste

End Sub

Sub List_Part_Names()
'
' List_Part_Names
' Copies Part Names
'

Sheets("U07-U07_for_vba").Select

Sheets("U07-U07_for_vba").Columns("C:C").Select

Selection.Copy

Sheets("vba_exec").Select

Columns("B:B").Select

ActiveSheet.Paste

End Sub

Sub List_Quatity()

```

```

" List_Quantity
' Copies Quantity Column
'
    Sheets("U07-U07_for_vba").Select
    Sheets("U07-U07_for_vba").Columns("D:D").Select
    Selection.Copy
    Sheets("vba_exec").Select
    Columns("C:C").Select
    ActiveSheet.Paste

End Sub

Sub Determine_Part_Type()
'
'***Determine the number of parts in the assembly

    Dim myRange As Range
    Dim No_of_Parts As Long

    Set myRange = Sheets("U07-U07_for_vba").Range("C:C")
    No_of_Parts = Application.WorksheetFunction.CountA(myRange) - 1

    Sheets("vba_exec").Range("B1").Value = No_of_Parts

'

    Dim j As Long
    Dim i As Long

```

Dim lcnt As Long

Sheets("U07-U07\_for\_vba").Select

N = No\_of\_Parts + 1

For j = 3 To N + 1

i = 0

i = i + j

' Determine\_Part\_Types

' Findsout if the part is Plate, Stiffener, Bracket of Flanged Plate

' M is the Plane Nest Length Column

    If Range("M" & i) <> 0 Then

' That means it is a Plate

    If Range("R" & i) <> "N/A" Then

' That means it IS NOT a Flanged Plate

,

\*\*\*PLATE CUTTING SECTION

' Continue with the flat plate algo - Cutting

'Part Nest Cut Length x Qty x PL\_Cut\_Metric

,

'plate thickness x

```
PL_Cut_Metric = Application.VLookup(Sheets("U07-U07_for_vba").Range("F" &
    i).Value, Sheets("PLCut_Schedule").Range("A:B"), 2, False)
```

```
PL_Cut_Time = Sheets("U07-U07_for_vba").Range("M" & i) * _
    Sheets("U07-U07_for_vba").Range("D" & i) / _
    PL_Cut_Metric
```

```
PL_Cut_Time = Sheets("U07-U07_for_vba").Range("M" & i) * _
    Sheets("U07-U07_for_vba").Range("D" & i) * _
    Sheets("Variables").Range("$G$15")
```

```
Sheets("vba_exec").Range("E" & i).NumberFormat = "0.00"
```

```
Sheets("vba_exec").Range("E" & i).Value = PL_Cut_Time
```

```
Sheets("vba_exec").Range("E2").Value = "PL_Cut_Time (min.)"
```

```
Sheets("vba_exec").Range("E2").WrapText = True
```

```
Sheets("vba_exec").Range("E" & i).HorizontalAlignment = xlCenter
```

```
Sheets("vba_exec").Range("E2").Font.Bold = True
```

.  
. .  
. . .

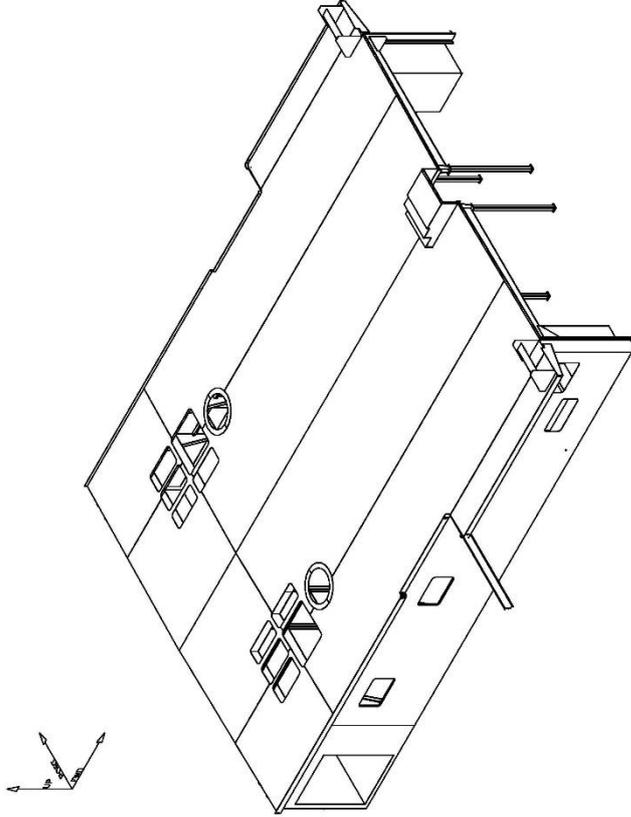
Next j

End Sub



## **APPENDIX J**

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
—	FIRST ISSUED	10-31-2014	SM



SHEET INDEX		
SHEET #	Description	REV
01	COVER PAGE	-
02	UPPER DK FR38-58 S PLATES	-
03	UPPER DK FR38-58 S SUPER PANEL	-
04	UPPER DK FR38-58 S PLATES + STIFFENERS	-
05	UPPER DK FR38-58 S PLATES + GIRDERS	-
06	UPPER DK FR38-58 S PLATES	-
07	UPPER DK FR38-58 S SUPERPANEL	-
08	UPPER DK FR38-58 S PLATES + STIFFENERS	-
09	UPPER DK FR38-58 S PLATES + GIRDERS	-
10	UPPER DK FR38-58 S	-
11	UPPER DK FR38-58 P PLATES	-
12	UPPER DK FR38-58 P SUPER PANEL	-
13	UPPER DK FR38-58 P PLATES + STIFFENERS	-
14	UPPER DK FR38-58 P PLATES + GIRDERS	-
15	UPPER DK FR38-58 P PLATES	-
16	UPPER DK FR38-58 P SUPERPANEL	-
17	UPPER DK FR38-58 P PLATES + STIFFENERS	-
18	UPPER DK FR38-58 P PLATES + GIRDERS	-
19	UPPER DK FR38-58 P	-
20	BUILD STAGE 01	-
21	LBHD 17FTD OCL FR38-58 S	-
22	LBHD 17FTD OCL FR38-58 S	-
23	LBHD 17FTD OCL FR38-58 S	-
24	LONG BHD 13FT8 S	-
25	TRANSV BHD FR41 S	-
26	TRANSV BHD FR39 S	-
27	VENT TRUNK SEAT S	-
28	DRIP PAN S	-
29	LBHD 17FTD OCL S + VT & DP	-
30	LBHD 17FTD OCL FR38-58 P	-
31	LBHD 17FTD OCL FR38-58 P	-
32	LBHD 17FTD OCL FR38-58 P	-
33	LONG BHD 13FT8 P	-
34	TRANSV BHD FR41 P	-
35	TRANSV BHD FR39 P	-
36	VENT TRUNK SEAT P	-
37	DRIP PAN P	-
38	LBHD 17FTD OCL P + VT & DP	-
39	BHD FR63 S	-
40	BHD FR63 P	-
41	BUILD STAGE 02	-
42	UPPER DK STANCHIONS	-
43	BUILD STAGE 03	-
44	INCLINED LADDER S	-
45	INCLINED LADDER P	-
46	UPPER DK STAR CL	-
47	UPPER DK STAR S	-
48	UPPER DK STAR P	-
49	BUILD STAGE 04	-

Weight: 62065.62lb  
 LCG: -102'-4 7/16" FWD/ AFT DIRECTION (+ FWD, FROM FRAME 00)  
 TCG: -1 1/16" STBD/ PORT DIRECTION (+ PORT, FROM CL)  
 VCG: 20'-7 13/16" UP/ DOWN DIRECTION (+ UP, FROM BASELINE)

REFERENCES	
NO	DWG NO
1	

REFERENCES	
DWG TITLE	
UNIT 07 ASSEMBLY DRAWINGS	

SIZE	DWG NO	REV
B	U07-U07.dwg	-

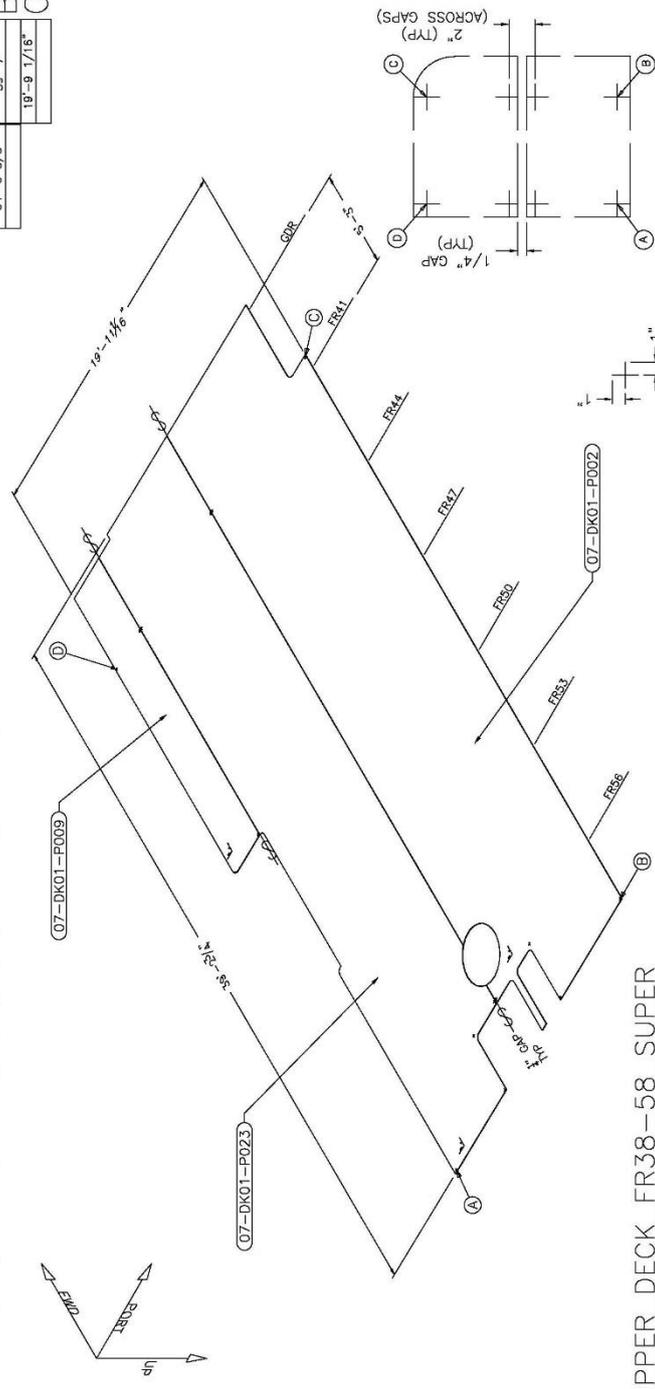
  

SCALE	DWG NO	SHEET 01 OF 49
NONE	180PB001-U07-839-001	

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
07-DK01-P002	1	STEEL_0.25	N/A	N/A	N/A	3734.361	NT1_4-065
07-DK01-P009	1	STEEL_0.25	N/A	N/A	N/A	460.137	NT1_4-048
07-DK01-P023	1	STEEL_0.25	N/A	N/A	N/A	2864.42	NT1_4-047

**BILL OF MATERIALS**

	B	C	D
	17'-2 1/16"	38'-4 5/16"	34'-4 13/16"
		34'-3 5/8"	39'-7"
			19'-9 1/16"



**UPPER DECK FR38-58 SUPER  
PANEL, STBD, BUILD STAGE 1**

ISOMETRIC VIEW  
N.T.S.

Weight: 7056.92lb  
 LCG: -94'-11 7/8"  
 TCG: -9'-5 5/16"  
 VCG: 20'-5"

SERIES WELD: \_\_\_\_\_  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 WELDERS NUMBER: \_\_\_\_\_  
 INSPECTED BY: \_\_\_\_\_

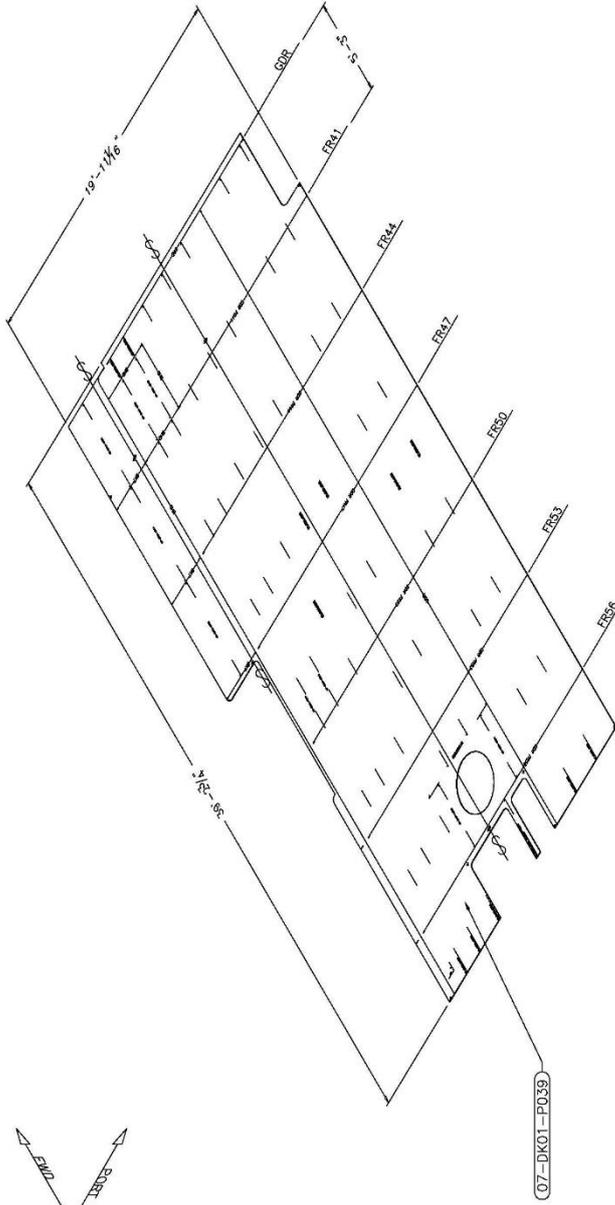
DK01+S/DK01  
 UPPER DK FR38-58 S PLATES  
 U07-DK01.dwg

REV	DATE	BY	CHKD
B		U07-DK01.dwg	

SCALE: NONE 180PB001-U07-839-001 SHEET 02

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
07-DK01-P039	1	SP MARKING 0.25	N/A	N/A	N/A	0	NT_SP MARKING 1_4-016

**BILL OF MATERIALS**



**UPPER DECK FR38-58 SUPER  
PANEL, STBD, BUILD STAGE 2**

ISOMETRIC VIEW

N.T.S.

Weight: 0.00lb  
 LCG: -9'4\"-11 3/4\"  
 TCG: -9'5 3/8\"  
 VCG: 20'-5\"

PLATE MARKING:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

SIZE	REV	DATE	BY
B	U07-DK01SP.dwg		
SCALE	NONE	180PB001-U07-839-001	SHEET 03

DK01+S/DK01SP  
 UPPER DK FR38-58 S SUPER PANEL

BILL OF MATERIALS						
Part Name	Qty	Stock	Length (ft)	EC Start	EC End	Nest
DK01	1	N/A	N/A	N/A	N/A	705B.918 N/A
DK01SP	1	N/A	N/A	N/A	N/A	0 N/A
07-DK01-S001	2	L3.0x2.0x.25	33'-1 1/2"	None	E079	132.843 N/A
07-DK01-S002	3	L3.0x2.0x.25	38'-4 3/8"	None	E079	153.88 N/A
07-DK01-S003	1	L3.0x2.0x.25	4'	E079	E020	15.848 N/A
07-DK01-S004	1	L3.0x2.0x.25	4'	E020	E079	15.848 N/A
07-DK01-S007	1	L3.0x2.0x.25	31'-2 3/8"	E002	E079	124.856 N/A
07-DK01-S008	1	L3.0x2.0x.25	6'-0 1/16"	E020	E079	23.787 N/A
07-DK01-S009	1	L3.0x2.0x.25	3'-1 3/8"	None	E079	12.347 N/A
07-DK01-S016	1	L3.0x2.0x.25	31'-2 3/8"	E002	E079	124.856 N/A
07-DK01-S036	1	L3.0x2.0x.25	1'-2 3/8"	E079	E079	4.493 N/A
07-DK01-S050	2	L3.0x2.0x.25	3'-10"	None	None	15.391 N/A
07-DK01-S051	1	L3.0x2.0x.25	1'-2 3/8"	E079	E079	4.493 N/A
07-DK01-S054	1	FB4x17/4	5'-11 3/4"	E020	E020	20.234 N/A
07-DK01-S055	1	FB4x17/4	5'-11 1/2"	E020	E020	20.164 N/A
07-DK01-S056	1	FB4x17/4	5'-3"	E020	E020	17.753 N/A

UPPER DECK FR38-58 SUPER  
 PANEL, STBD, BUILD STAGE 3

ISOMETRIC VIEW  
 N.T.S.

Weight: 8201.71lb  
 LCG: -95°-0 3/4"  
 TCC: -8'-6 5/16"  
 VCG: 20'-4 11/16"

STRUCTURAL FIT: \_\_\_\_\_  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL WELD: \_\_\_\_\_  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL CUT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

DK01+G/DK01+S  
 UPPER DK FR38-58 S PLATES + STIFFENERS

SCALE: NONE | 180PB001-U07-839-001 | SHEET 04

BILL OF MATERIALS						
Part Name	Qty	Stock	Length (ft)	EC Start	EC End	Nest
DK01+S	1	N/A	N/A	N/A	N/A	N/A
07-DK01-F001	1	FR44 1/4	6'-2 7/8"	None	None	N/A
07-DK01-P003	1	STEEL_0.375	N/A	N/A	N/A	N/A
07-DK01-P004	1	STEEL_0.375	N/A	N/A	N/A	N/A
07-DK01-P005	1	STEEL_0.375	N/A	N/A	N/A	N/A
07-DK01-P008	1	STEEL_0.375	N/A	N/A	N/A	N/A
07-DK01-P012	1	STEEL_0.25	N/A	N/A	N/A	N/A
07-DK01-P014	1	STEEL_0.375	N/A	N/A	N/A	N/A
07-DK01-P016	1	STEEL_0.25	N/A	N/A	N/A	N/A
07-DK01-P017	1	STEEL_0.375	N/A	N/A	N/A	N/A
07-DK01-P018	1	STEEL_0.3125	N/A	N/A	N/A	N/A
07-DK01-P020	1	STEEL_0.375	N/A	N/A	N/A	N/A
07-DK01-P022	1	STEEL_0.3125	N/A	N/A	N/A	N/A
07-DK01-P030	1	STEEL_0.375	N/A	N/A	N/A	N/A
07-DK01-P033	1	STEEL_0.375	N/A	N/A	N/A	N/A
07-DK01-P036	1	STEEL_0.375	N/A	N/A	N/A	N/A
07-DK01-P061	1	STEEL_0.375	N/A	N/A	N/A	N/A
07-DK01-P01B	1	N/A	N/A	N/A	N/A	N/A
07-DK01-P012	1	N/A	N/A	N/A	N/A	N/A
07-DK01-P008	1	N/A	N/A	N/A	N/A	N/A
07-DK01-P005	1	N/A	N/A	N/A	N/A	N/A
07-DK01-P061	1	N/A	N/A	N/A	N/A	N/A
07-DK01-P017	1	N/A	N/A	N/A	N/A	N/A
07-DK01-P014	1	N/A	N/A	N/A	N/A	N/A
07-DK01-P016	1	N/A	N/A	N/A	N/A	N/A
07-DK01-P017	1	N/A	N/A	N/A	N/A	N/A
07-DK01-P018	1	N/A	N/A	N/A	N/A	N/A
07-DK01-P020	1	N/A	N/A	N/A	N/A	N/A
07-DK01-P022	1	N/A	N/A	N/A	N/A	N/A
07-DK01-P030	1	N/A	N/A	N/A	N/A	N/A
07-DK01-P033	1	N/A	N/A	N/A	N/A	N/A
07-DK01-P036	1	N/A	N/A	N/A	N/A	N/A
07-DK01-P061	1	N/A	N/A	N/A	N/A	N/A
8201.706						
21.221						
370.513						
372.536						
134.167						
22.49						
24.547						
189.682						
24.547						
24.571						
4.842						
189.682						
4.718						
189.682						
189.682						
191.935						
276.772						

STRUCTURAL FIT: STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

STRUCTURAL WELD: STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

STRUCTURAL FIT: STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

STRUCTURAL WELD: STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

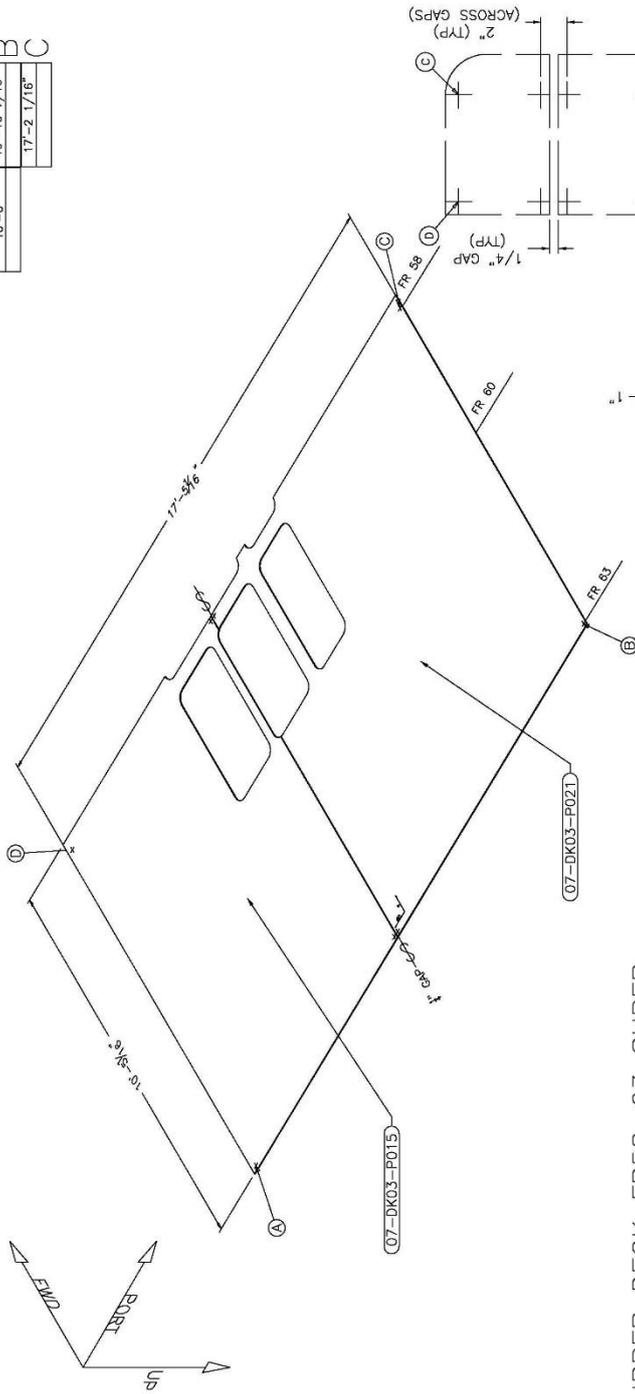
Weight: 10433.39lb  
LCG: -94'-8 15/16"  
TCG: -8'-5 13/16"  
VCG: 20'-3 1/4"

DK01+S / DK01+G  
UPPER DK FR38-58 S PLATES + GIRDERS

SCALE: NONE | 180PB001-U07-839-001 | SHEET 05

BILL OF MATERIALS						
Part Name	Qty	Stock	Length (ft)	EC Start	EC End	Nest
07-DK03-P015	1	STEEL_0.25	N/A	N/A	N/A	NT1_4-048
07-DK03-P021	1	STEEL_0.25	N/A	N/A	N/A	NT1_4-057

B	C	D
17'-2 1/16"	19'-10 7/16"	10'-0"
	10'-0"	19'-10 7/16"
		17'-2 1/16"



UPPER DECK FR58-63 SUPER  
 PANEL, STBD, BUILD STAGE 1  
 ISOMETRIC VIEW  
 N.T.S.

Weight: 1665.98lb  
 LCG: -121'-2 1/2"  
 TCC: -8'-8 11/16"  
 VCC: 20'-5 3/16"

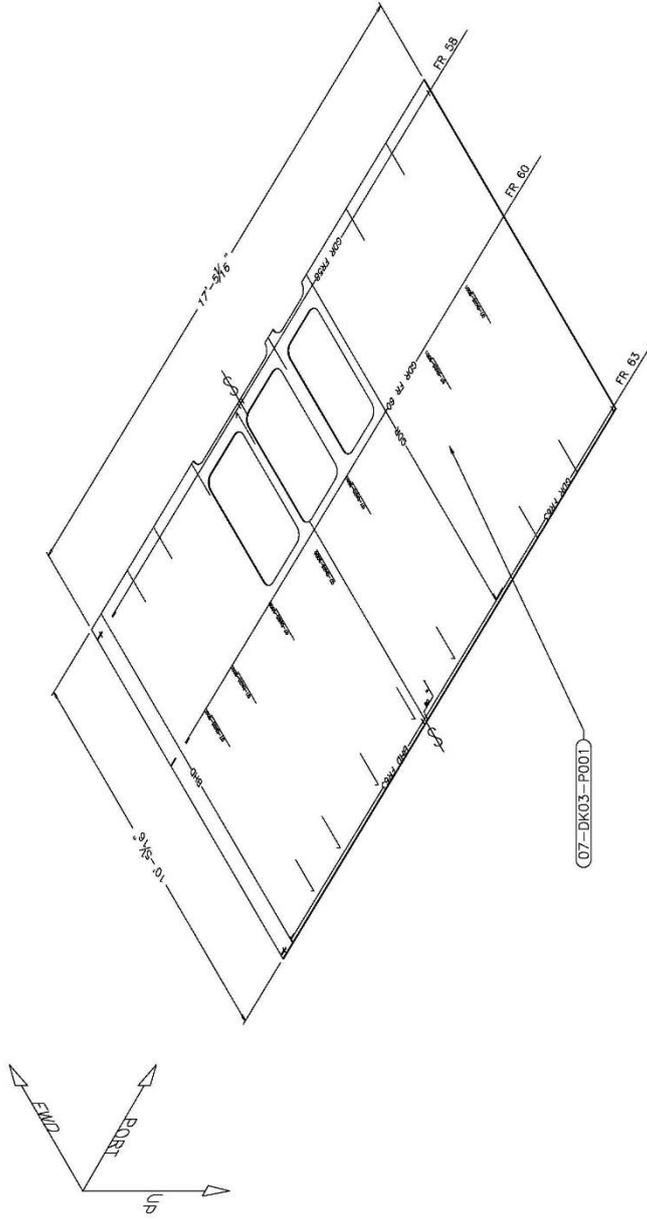
SERIES WELD:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 WELDERS NUMBER:  
 INSPECTED BY:

DIMENSION CONTROL MATRIX KEYPLAN  
 POINTS TAKEN TO CROSS MARKINGS  
 TYPICAL FOR ALL CONTROL POINTS

DK03+S/DK03  
 UPPER DK FR58-63 S PLATES

SCALE	TYPING NO.	RS
NONE	U07-DK03.dwg	
SCALE NONE	180PB001-U07-839-001	SHEET 06

BILL OF MATERIALS						
Part Name	Qty	Stock	Length (ft)	EC Start	EC End	Wt (lb)
07-DK03-P001	1	SP MARKING 0.25	N/A	N/A	N/A	0
					NT_SP MARKING	1_4-017



UPPER DECK FR58-63 SUPER  
 PANEL, STBD, BUILD STAGE 2  
 ISOMETRIC VIEW  
 N.T.S.

Weight: 0.00lb  
 LCG: -121'-2 1/2"  
 TCC: -8'-8 3/4"  
 VCC: 20'-5 3/16"

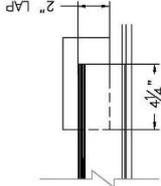
PLATE MARKING:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

DK03+S/DK03SP	
UPPER DK FR58-63 S SUPERPANEL	
DATE TIME	RS
B	U07-DK03SP.dwg
SCALE	NONE 180PB001-U07-839-001 SHEET 07

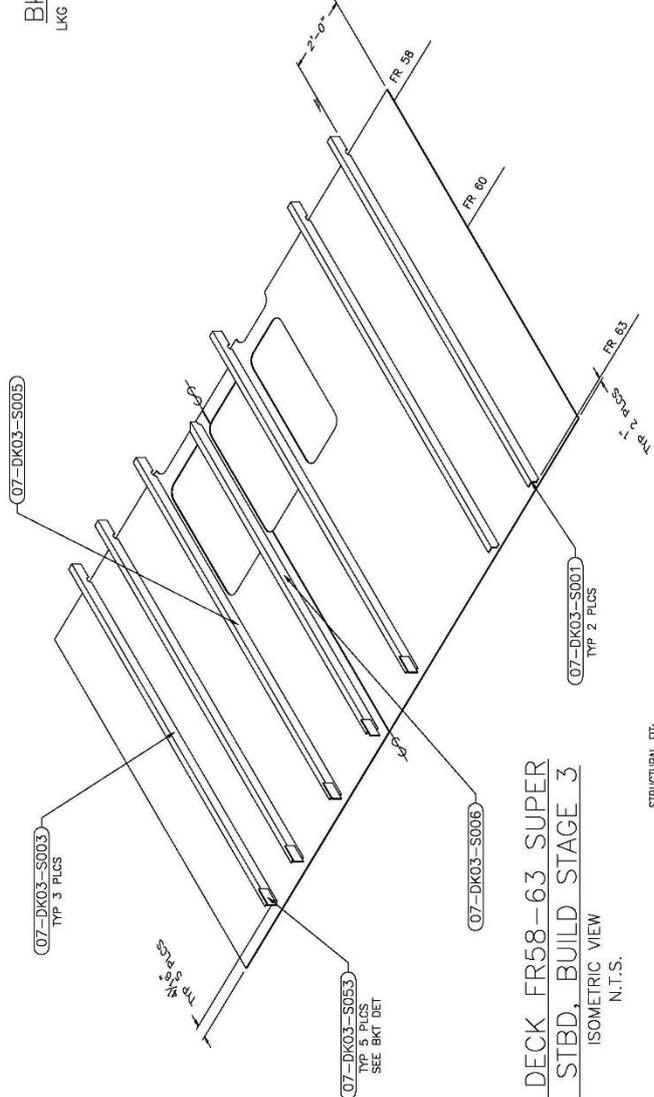
**BILL OF MATERIALS**

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
DK03	1	N/A	N/A	N/A	N/A	1665.978	N/A
DK03SP	1	N/A	N/A	N/A	N/A	0	N/A
07-DK03-S001	2	L3.0x2.0x.25	10'-11 3/16"	E020	None	43.735	N/A
07-DK03-S003	3	L3.0x2.0x.25	10'-8 1/8"	None	None	42.766	N/A
07-DK03-S005	1	L3.0x2.0x.25	10'-8 1/8"	None	None	42.766	N/A
07-DK03-S006	1	L3.0x2.0x.25	9'-8 5/8"	None	E079	38.863	N/A
07-DK03-S053	5	FB3x1/4	6"	None	None	1.276	N/A

STRUCTURAL FIT: \_\_\_\_\_  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_  
 STRUCTURAL WELD: \_\_\_\_\_  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_  
 STRUCTURAL CUT: \_\_\_\_\_  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_



**BKT DEI**  
 LKG PORT - N.T.S.



**UPPER DECK FR58-63 SUPER  
 PANEL, STBD, BUILD STAGE 3**

ISOMETRIC VIEW  
 N.T.S.

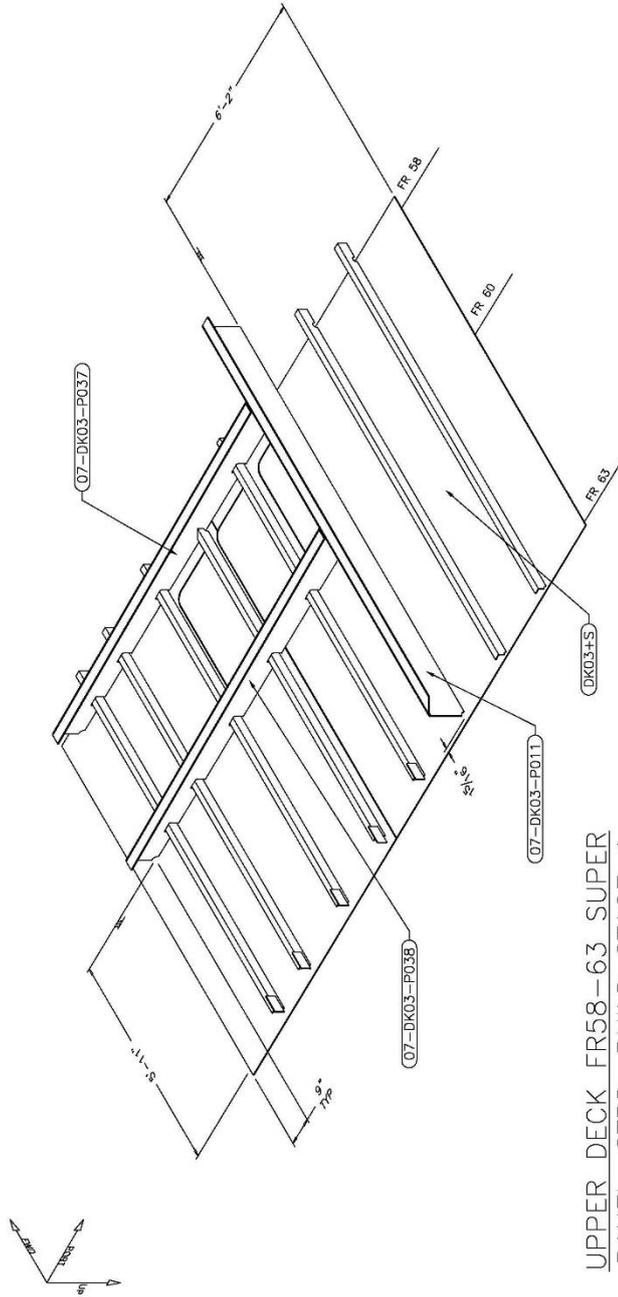
Weight: 1969.76lb  
 LCG: -121'-1 9/16"  
 TCC: -8'-10 5/16"  
 VCG: 20'-4 13/16"

STRUCTURAL FIT: \_\_\_\_\_  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_  
 STRUCTURAL CUT: \_\_\_\_\_  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_  
 STRUCTURAL WELD: \_\_\_\_\_  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

DK03+G/DK03+S  
 UPPER DK FR58-63 S PLATES + STIFFENERS

SCALE: NONE | 180PB001-U07-839-001 | SHEET 08

BILL OF MATERIALS						
Part Name	Qty	Stock	Length (ft)	EC Start	EC End	Nest
DK03+S	1	N/A	N/A	N/A	N/A	N/A
07-DK03-P011	1	STEEL_0.375	N/A	N/A	N/A	N/A
07-DK03-P037	1	STEEL_0.375	N/A	N/A	N/A	N/A
07-DK03-P038	1	STEEL_0.375	N/A	N/A	N/A	N/A



UPPER DECK FR58-63 SUPER  
 PANEL, STBD, BUILD STAGE 4

ISOMETRIC VIEW  
 N.T.S.

STRUCTURAL FIT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL WELD:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL CUT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

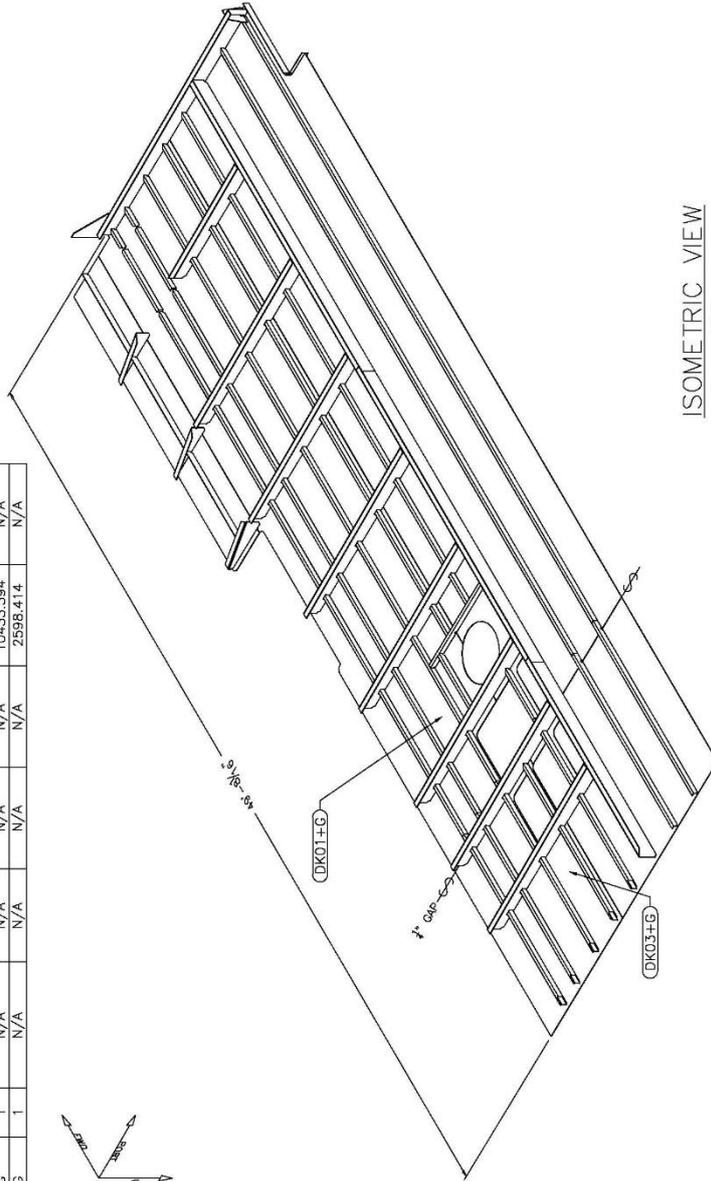
Weight: 2598.41lb  
 LCG: -120'-6 5/8"  
 TCC: -8'-11 5/8"  
 VCC: 20'-3 1/8"

DK01+03/DK03+G  
 UPPER DK FR58-63 S PLATES + GIRDERS

SCALE	180PB001-U07-839-001	SHEET 09
DATE	U07-DK03+G.dwg	
BY		

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
DK01+G	1	N/A	N/A	N/A	N/A	10433.394	N/A
DK03+G	1	N/A	N/A	N/A	N/A	2596.414	N/A

**BILL OF MATERIALS**



ISOMETRIC VIEW

N.T.S.

Weight: 13031.81lb  
 LCG: -99'-10 11/16"  
 TCC: -8'-4 9/16"  
 VCC: 20'-3 3/16"

STRUCTURAL FIT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_  
 STRUCTURAL WELD:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

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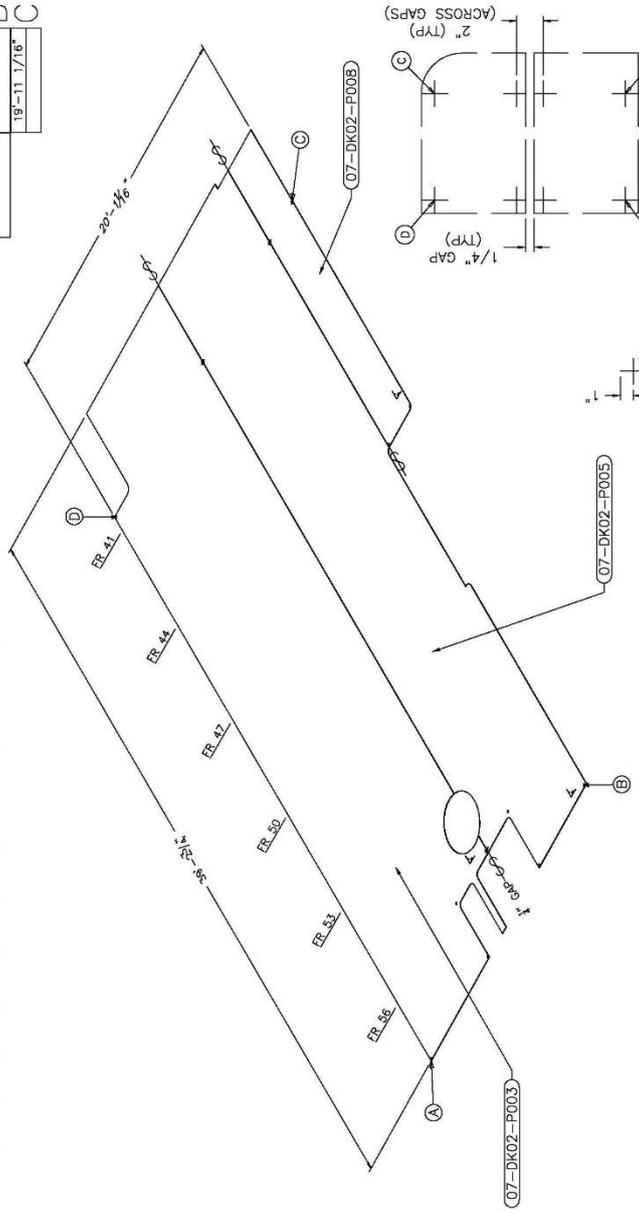
BS01/DK01+03  
 UPPER DK FR38-63 S

DATE	TIME	NO.	REV.
B	U07-DK01+03.dwg		-
SCALE	NONE	180PB001-U07-839-001	SHEET 10

**BILL OF MATERIALS**

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
07-DK02-P003	1	STEEL 0.25	N/A	N/A	N/A	3736.269	NT1_4-056
07-DK02-P005	1	STEEL 0.25	N/A	N/A	N/A	2921.174	NT1_4-046
07-DK02-P008	1	STEEL 0.25	N/A	N/A	N/A <td 460.137	NT1_4-048	

	B	C	D
	17'-4 1/16"	39'-8"	54'-3 5/8"
		34'-4 13/16"	38'-5 3/16"
			19'-11 1/16"



UPPER DECK FR38-58 SUPER  
 PANEL, PORT, BUILD STAGE 1  
 ISOMETRIC VIEW  
 N.T.S.

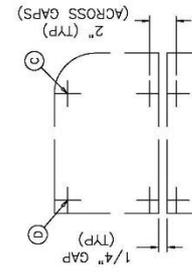
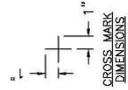
Weight: 7117.60lb  
 LCG: -95'-0 3/16"  
 TCC: 9'-4 3/8"  
 VCC: 20'-5 1/16"

SERIES WELD:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 WELDERS NUMBER: \_\_\_\_\_  
 INSPECTED BY: \_\_\_\_\_

DK02+S/DK02  
 UPPER DK FR38-58 P PLATES

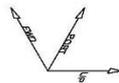
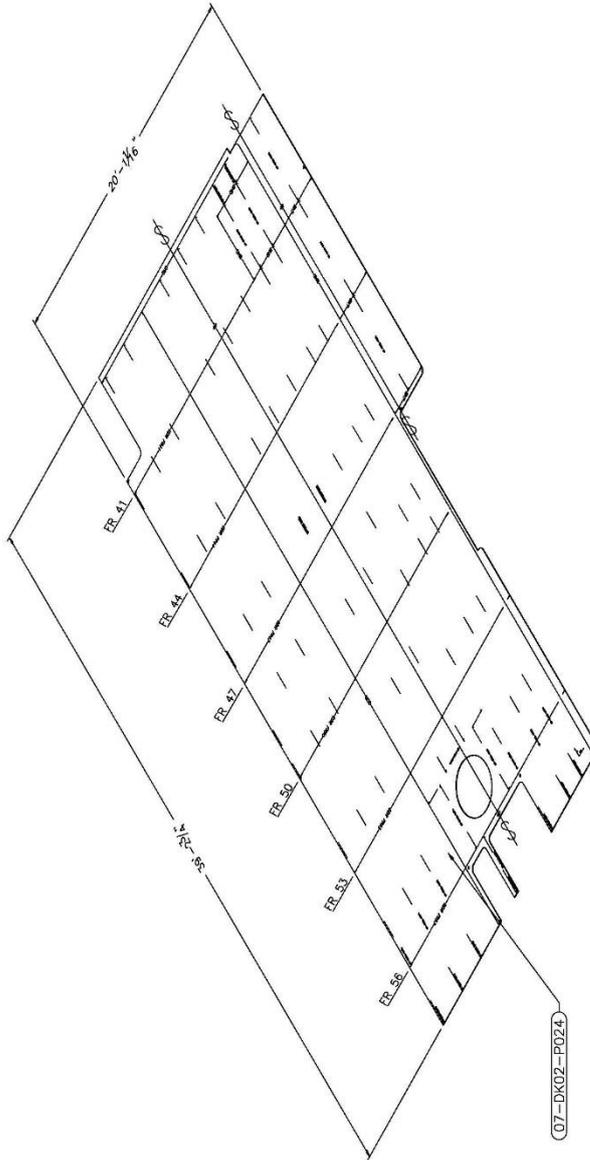
SCALE	TITLE NO.	REV.
NONE	U07-DK02.dwg	-
180PB001-U07-839-001		SHEET 11

DIMENSION CONTROL MATRIX KEYPLAN  
 POINTS TAKEN TO CROSS MARKINGS  
 TYPICAL FOR ALL CONTROL POINTS



Part Name	Qty	Stock	Length (ft)	EC	Start	EC	End	WT (lb)	Nest
07-DK02-P024	1	SP MARKING 0.25	N/A	N/A	N/A	N/A	0	0	NT_SF MARKING 1_4-015

**BILL OF MATERIALS**



(07-DK02-P024)

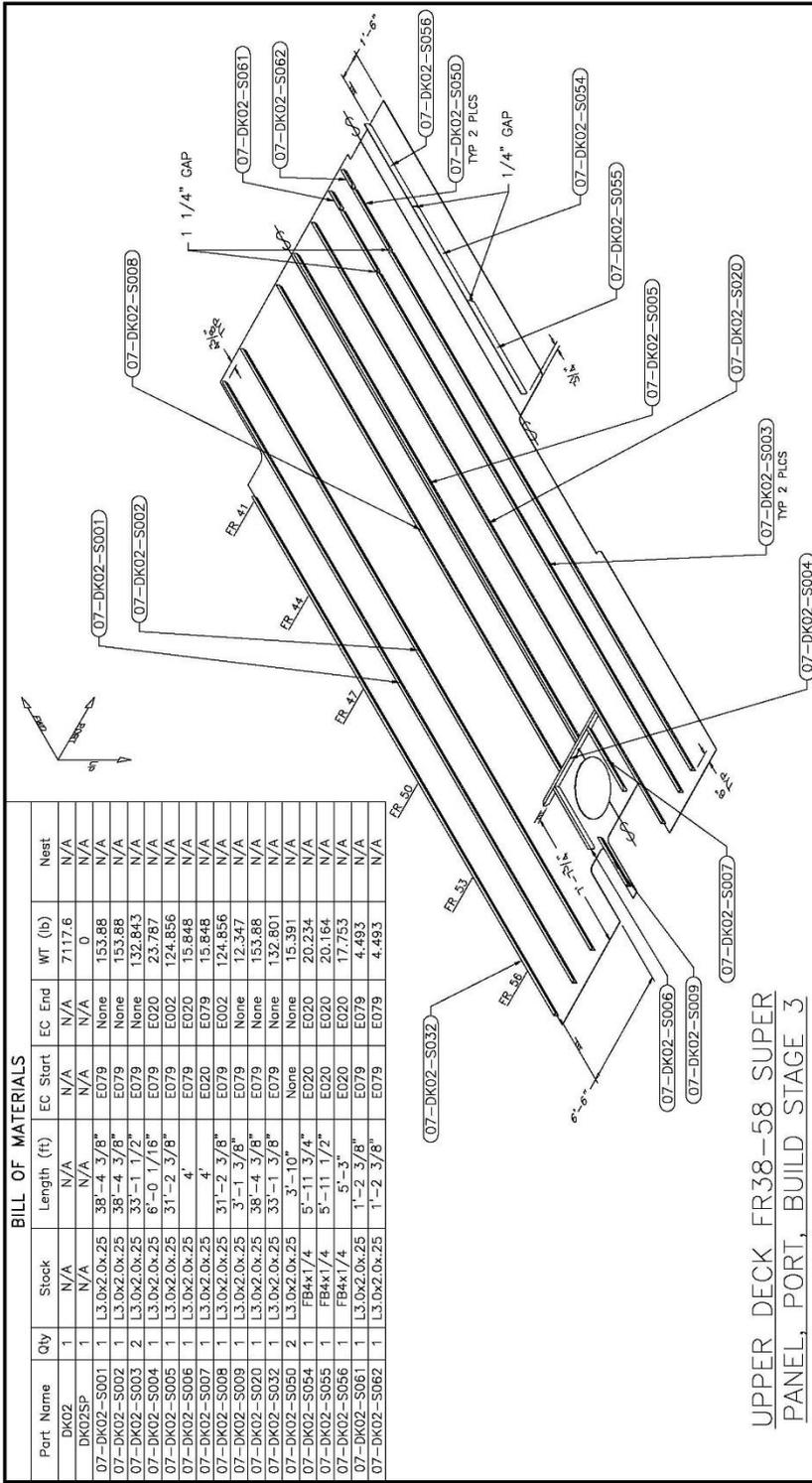
**UPPER DECK FR38-58 SUPER  
PANEL, PORT, BUILD STAGE 2**

ISOMETRIC VIEW  
N.T.S.

Weight: 0.00lb  
LCG: -95°-0' 1/8"  
TCG: 9°-4' 7/16"  
VCG: 20°-5' 1/16"

PLATE MARKING:  
SPIDS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

DK02+S/DK02SP	
UPPER DK FR38-58 P SUPER PANEL	
DATE TIME NO	RS
B U07-DK02SP.dwg	-
SCALE NONE	180PB001-U07-839-001 SHEET 12



**BILL OF MATERIALS**

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
DK02	1	N/A	N/A	N/A	N/A	7117.6	N/A
DK02SP	1	N/A	N/A	N/A	N/A	0	N/A
07-DK02-S001	1	L3.0x2.0x.25	38'-4 3/8"	E079	None	153.88	N/A
07-DK02-S002	1	L3.0x2.0x.25	38'-4 3/8"	E079	None	153.88	N/A
07-DK02-S003	2	L3.0x2.0x.25	33'-1 1/2"	E079	None	132.843	N/A
07-DK02-S004	1	L3.0x2.0x.25	6'-0 1/16"	E079	E020	23.787	N/A
07-DK02-S005	1	L3.0x2.0x.25	31'-2 3/8"	E079	E002	124.856	N/A
07-DK02-S006	1	L3.0x2.0x.25	4'	E079	E020	15.848	N/A
07-DK02-S007	1	L3.0x2.0x.25	4'	E020	E079	15.848	N/A
07-DK02-S008	1	L3.0x2.0x.25	31'-2 3/8"	E079	E002	124.856	N/A
07-DK02-S009	1	L3.0x2.0x.25	3'-1 3/8"	E079	None	12.347	N/A
07-DK02-S020	1	L3.0x2.0x.25	38'-4 3/8"	E079	None	153.88	N/A
07-DK02-S032	1	L3.0x2.0x.25	33'-1 3/8"	E079	None	132.801	N/A
07-DK02-S050	2	L3.0x2.0x.25	3'-10"	None	None	15.391	N/A
07-DK02-S054	1	FB4x1/4	5'-11 3/4"	E020	E020	20.234	N/A
07-DK02-S055	1	FB4x1/4	5'-11 1/2"	E020	E020	20.164	N/A
07-DK02-S056	1	FB4x1/4	5'-3"	E020	E020	17.753	N/A
07-DK02-S061	1	L3.0x2.0x.25	1'-2 3/8"	E079	E079	4.493	N/A
07-DK02-S062	1	L3.0x2.0x.25	1'-2 3/8"	E079	E079	4.493	N/A

**UPPER DECK FR38-58 SUPER  
PANEL, PORT, BUILD STAGE 3**  
ISOMETRIC VIEW  
N.T.S.

Weight: 8393.19lb  
 LCG: -95°-1 11/16"  
 TCC: 9'-3 11/16"  
 VCC: 20'-4 3/4"

STRUCTURAL FIT: STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL CUT: STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL WELD: STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

DK02+G/DK02+S  
 UPPER DK FR38-58 P PLATES + STIFFENERS

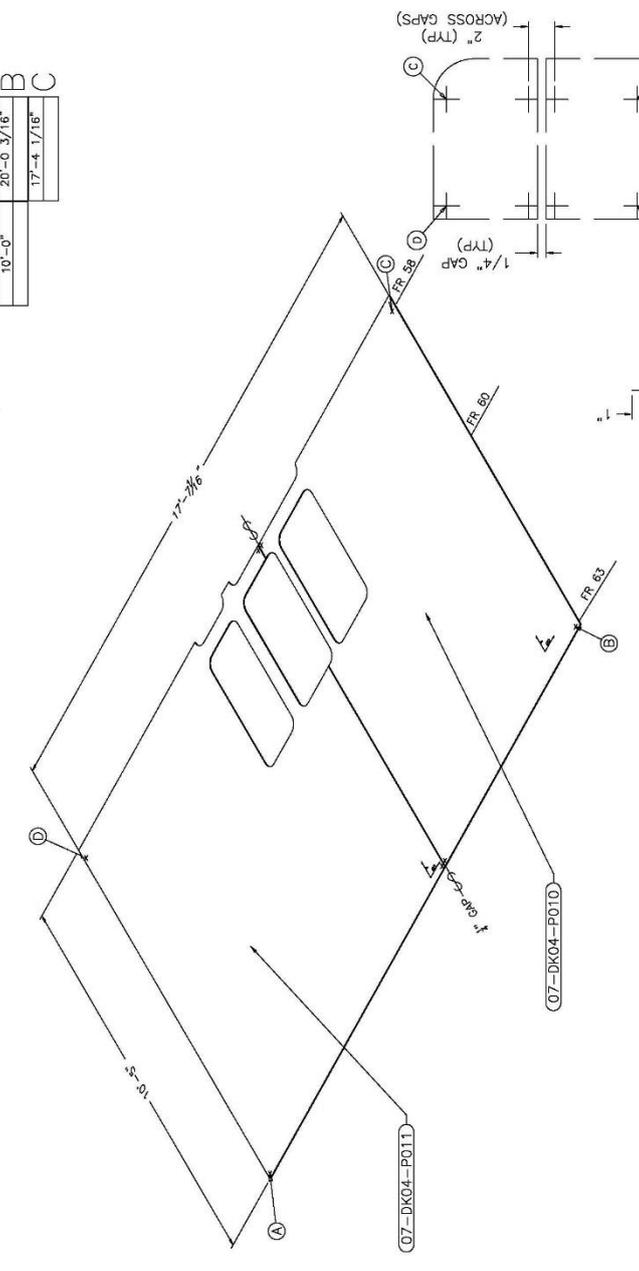
DATE: 11/16/11  
 DRAWING NO: U07-DK02+S.dwg  
 SCALE: NONE | 180PB001-U07-839-001 | SHEET 13



Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
07-DK04-P010	1	STEEL_0.25	N/A	N/A	N/A	737.586	NT1_4-048
07-DK04-P011	1	STEEL_0.25	N/A	N/A	N/A	946.12	NT1_4-057

**BILL OF MATERIALS**

	B	C	D
A	17'-4 1/16"	20'-0 3/16"	10'-0"
B	10'-0"	20'-0 3/16"	17'-4 1/16"
C	17'-4 1/16"	17'-4 1/16"	17'-4 1/16"



UPPER DECK FR58-63 SUPER  
 PANEL, PORT, BUILD STAGE 1  
 ISOMETRIC VIEW  
 N.T.S.

Weight: 1683.71lb  
 LCG: -121'-2 7/16"  
 TCC: 8'-7 5/8"  
 VCC: 20'-5 3/16"

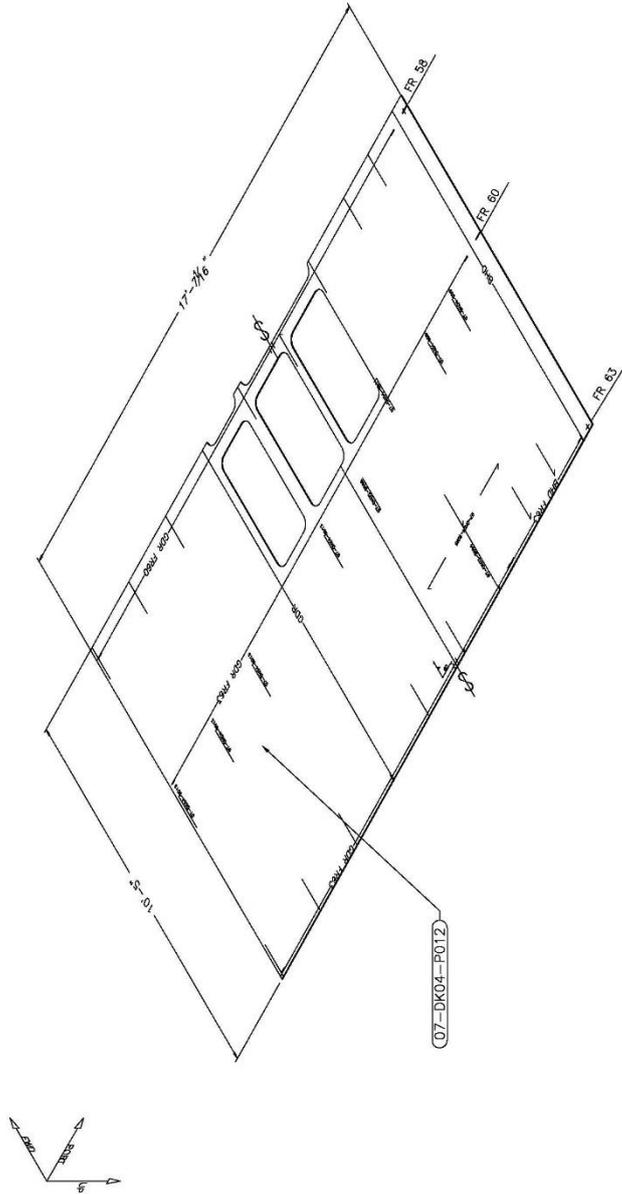
SERIES WELD: \_\_\_\_\_  
 SPANUS: ACCEPTABLE / NOT ACCEPTABLE  
 WELDERS NUMBER: \_\_\_\_\_  
 INSPECTED BY: \_\_\_\_\_

DK04+S/DK04	UPPER DK FR58-63 P PLATES
U07-DK04.dwg	
SCALE NONE	180PB001-U07-839-001
	SHEET 15

DIMENSION CONTROL MATRIX KEYPLAN  
 POINTS TAKEN TO CROSS MARKINGS  
 TYPICAL FOR ALL CONTROL POINTS

GROSS MARK  
 DIMENSIONS

BILL OF MATERIALS						
Part Name	Qty	Stock	Length (ft)	EC Start	EC End	Nest
07-DK04-P012	1	SP MARKING 0.25	N/A	N/A	N/A	NT_SP MARKING 1_4-01B
						WT (lb) 0



UPPER DECK FR58-63 SUPER  
 PANEL, PORT, BUILD STAGE 2  
 ISOMETRIC VIEW  
 N.T.S.

Weight: 0.00lb  
 LCG: -121'-2 1/2"  
 TCC: 8'-7 5/8"  
 VCC: 20'-5 3/16"

PLATE MARKING:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

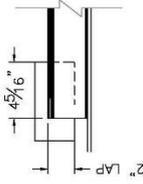
DK04+S/DK04SP	
UPPER DK FR58-63 P SUPERPANEL	
SIZE	FR
B	U07-DK04SP.dwg
SCALE	NONE 180PB001-U07-839-001 SHEET 16

**BILL OF MATERIALS**

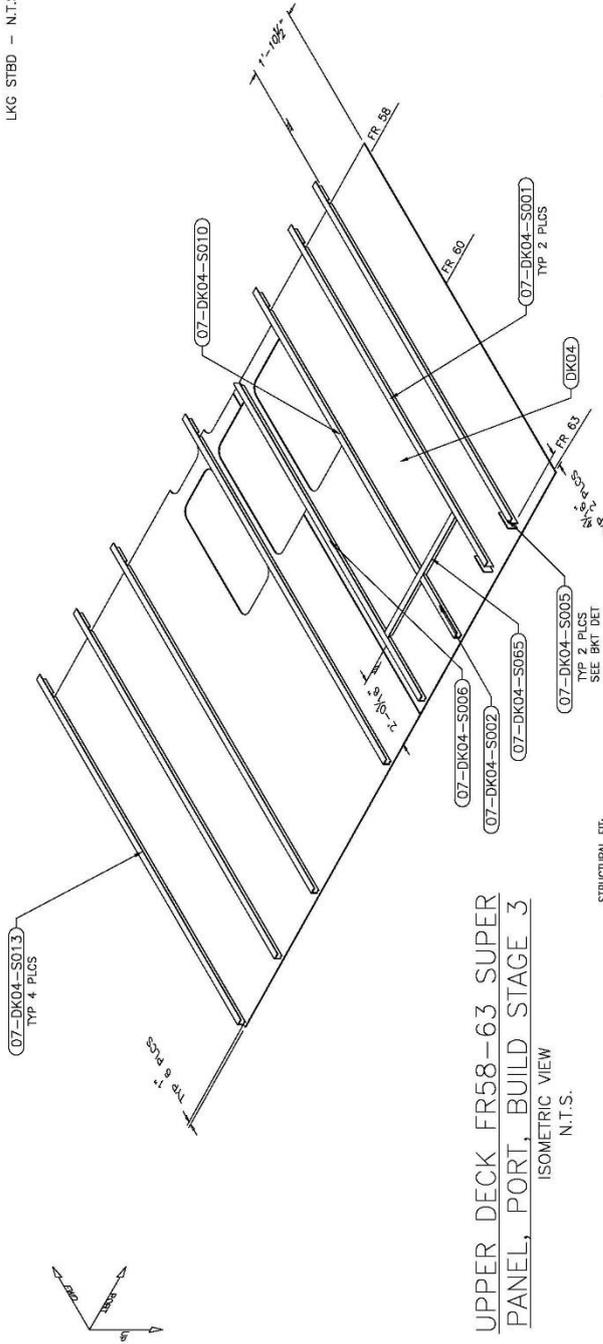
Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
DK04	1	N/A	N/A	N/A	N/A	1683.706	N/A
DK04SP	1	N/A	N/A	N/A	N/A	0	N/A
07-DK04-S001	2	L3.0x2.0x.25	10'-8 3/16"	None	E020	42.776	N/A
07-DK04-S002	1	L3.0x2.0x.25	1'-11 7/8"	E002	None	7.666	N/A
07-DK04-S005	2	FB3x1/4"	6"	None	None	1.276	N/A
07-DK04-S006	1	L3.0x2.0x.25	10'-0 3/4"	E079	E020	40.186	N/A
07-DK04-S010	1	L3.0x2.0x.25	8'-11 1/8"	None	E020	35.683	N/A
07-DK04-S013	4	L3.0x2.0x.25	10'-11 1/4"	None	E020	43.746	N/A
07-DK04-S065	1	L3.0x2.0x.25	3'-11 11/16"	None	E002	15.607	N/A

STRUCTURAL FIT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

STRUCTURAL WELD:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_



**BKT DET**  
LKG STBD - N.T.S.



**UPPER DECK FR58-63 SUPER  
PANEL, PORT, BUILD STAGE 3**  
ISOMETRIC VIEW  
N.T.S.

STRUCTURAL FIT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

STRUCTURAL CUT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

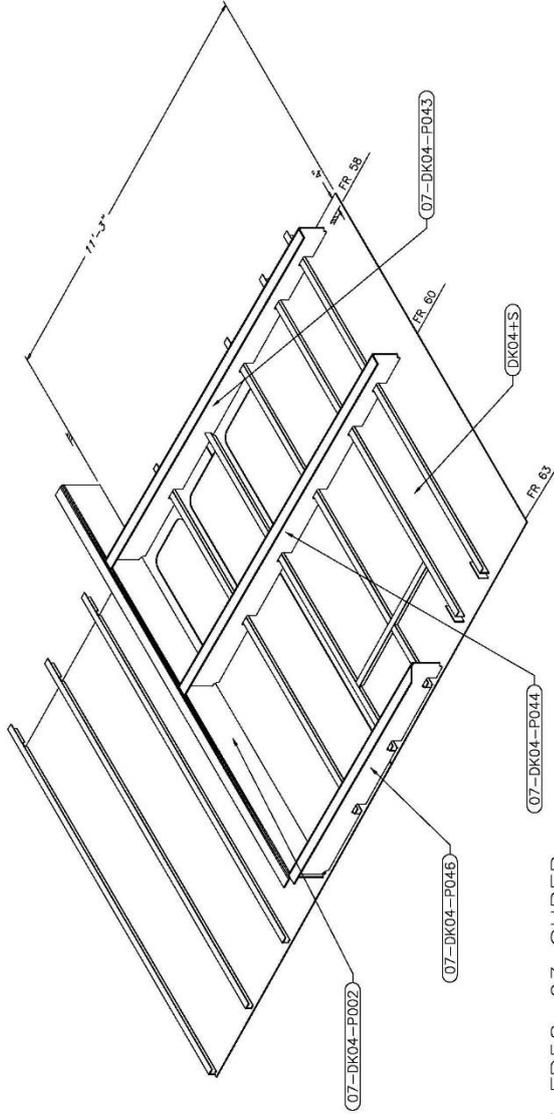
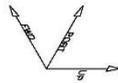
Weight: 2045.96lb  
LCG: -121'-1 11/16"  
TCC: 8'-7 7/16"  
VCC: 20'-4 13/16"

DK04+G/DK04+S  
UPPER DK FR58-63 P PLATES + STIFFENERS

SCALE: NONE | 180PB001-U07-839-001 | SHEET 17

**BILL OF MATERIALS**

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
DK04+S	1	N/A	N/A	N/A	N/A	2045.957	N/A
07-DK04-P002	1	STEEL_0.375	N/A	N/A	N/A	250.973	NT3_B-005
07-DK04-P043	1	STEEL_0.375	N/A	N/A	N/A	190.808	NT3_B-007
07-DK04-P044	1	STEEL_0.375	N/A	N/A	N/A	189.882	NT3_B-005
07-DK04-P046	1	STEEL_0.375	N/A	N/A	N/A	123.992	NT3_B-006



**UPPER DECK FR58-63 SUPER  
PANEL, PORT, BUILD STAGE 4**

ISOMETRIC VIEW  
N.T.S.

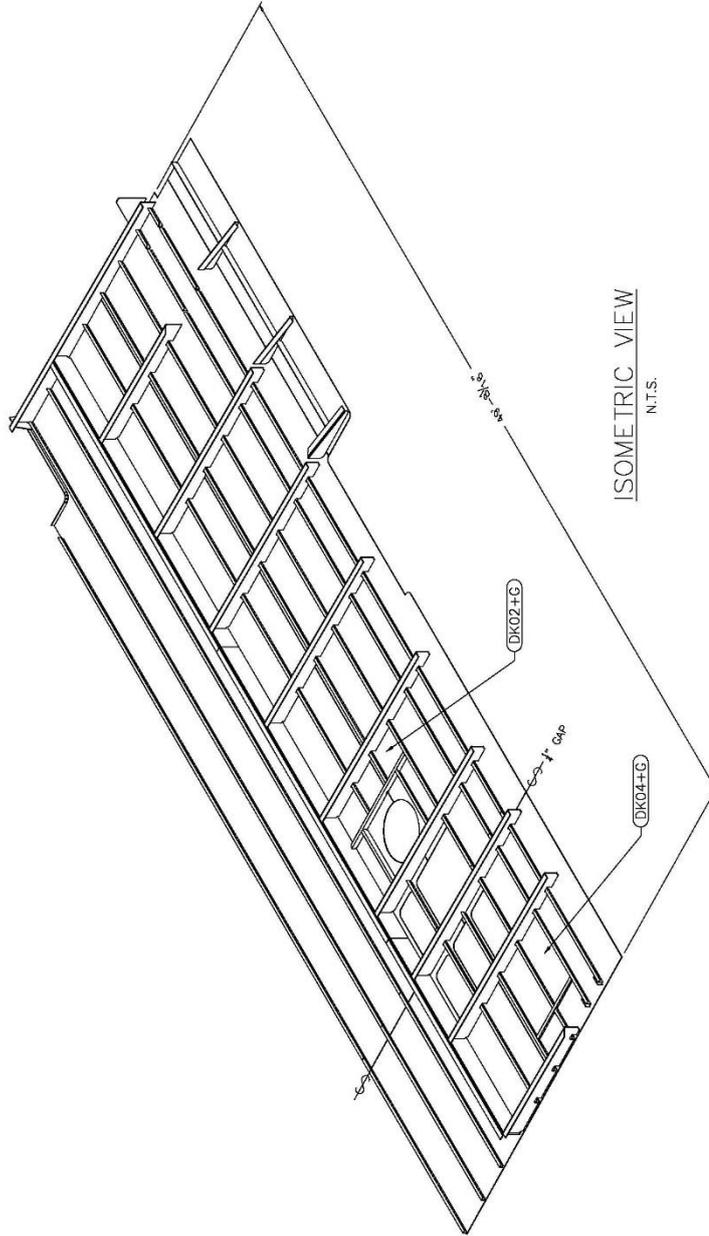
Weight: 2801.41lb  
 LCG: -120'-9 7/8"  
 TCC: 8'-9 11/16"  
 VCC: 20'-2 15/16"

STRUCTURAL FIT: \_\_\_\_\_  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_  
 STRUCTURAL CUT: \_\_\_\_\_  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

DK02+04/DK04+G  
 UPPER DK FR58-63 P PLATES + GIRDERS  
 DRAWING NO. B U07-DK04+G.dwg  
 SCALE NONE 180PB001-U07-839-001 SHEET 18

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
DK02+G	1	N/A	N/A	N/A	N/A	10625.675	N/A
DK04+G	1	N/A	N/A	N/A	N/A	2801.413	N/A

**BILL OF MATERIALS**



ISOMETRIC VIEW  
N.T.S.

Weight: 13427.09lb  
 LCG: -100'-2.7/8"  
 TCC: 9'-2.1/2"  
 VCC: 20'-3.3/16"

STRUCTURAL FIT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_  
 STRUCTURAL CUT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_  
 STRUCTURAL WELD:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

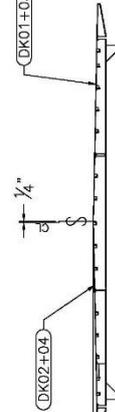
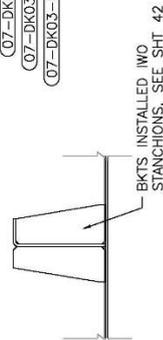
BS01/DK02+04  
 UPPER DK FR38-63 P

SCALE	NONE	180PB001-U07-839-001	SHEET 19
DATE	U07-DK02+04.dwg		
REV			

**BILL OF MATERIALS**

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Neet
DK01+03	1	N/A	N/A	N/A	N/A	13031.808	N/A
DK02+04	1	N/A	N/A	N/A	N/A	13427.088	N/A
07-DK01-P001	1	STEEL-0.375	N/A	N/A	N/A	295.17	NT3-B-006
07-DK01-P013	4	STEEL-0.3125	N/A	N/A	N/A	4.752	NT5-16-005
07-DK01-P025	5	STEEL-0.375	N/A	N/A	N/A	254.045	NT3-B-006
07-DK02-P028	4	STEEL-0.3125	N/A	N/A	N/A	5.331	NT5-16-005
07-DK02-P013	4	STEEL-0.3125	N/A	N/A	N/A	4.752	NT5-16-005
07-DK02-P028	4	STEEL-0.3125	N/A	N/A	N/A	5.331	NT5-16-005
07-DK03-P002	1	STEEL-0.375	N/A	N/A	N/A	254.045	NT3-B-005
07-DK03-P004	1	STEEL-0.375	N/A	N/A	N/A	254.045	NT3-B-006
07-DK03-P006	1	STEEL-0.3125	N/A	N/A	N/A	5.29	NT5-16-005
07-DK03-P007	1	STEEL-0.3125	N/A	N/A	N/A	4.717	NT5-16-005
07-DK03-P013	2	STEEL-0.3125	N/A	N/A	N/A	4.752	NT5-16-005
07-DK03-P026	1	STEEL-0.3125	N/A	N/A	N/A	5.29	NT5-16-005
07-DK03-P027	1	STEEL-0.3125	N/A	N/A	N/A	4.717	NT5-16-005
07-DK03-P028	2	STEEL-0.3125	N/A	N/A	N/A	5.331	NT5-16-005
07-DK03-P045	1	STEEL-0.375	N/A	N/A	N/A	251.23	NT3-B-005

STRUCTURAL FIT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_  
STRUCTURAL WELD:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

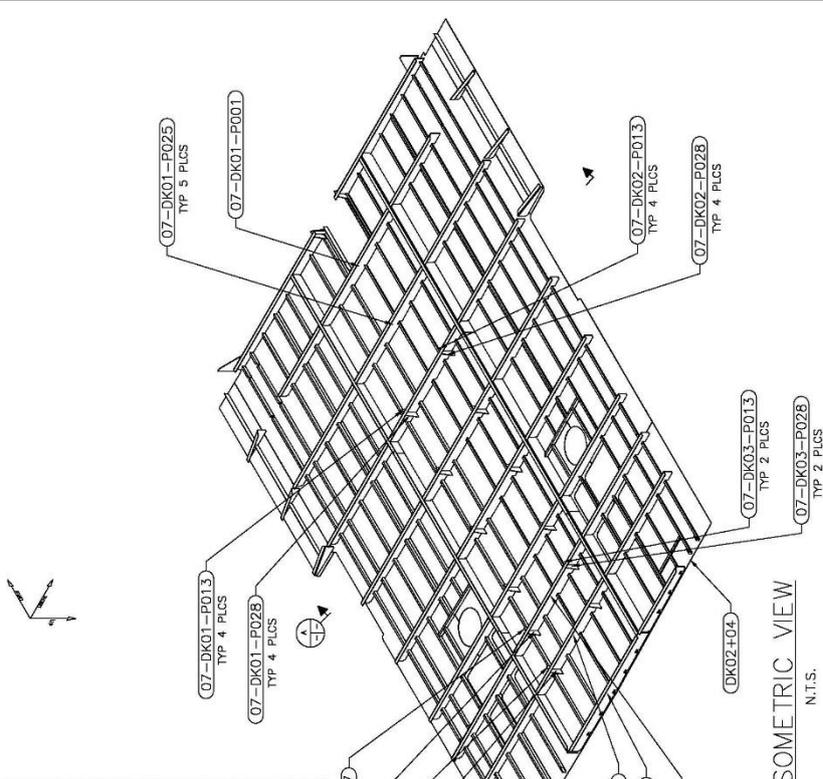


**SECTION VIEW A**

LKG FWD - N.I.S.

Weight: 28864.45lb  
LCG: -100'-5 13/16"  
TCG: 9/16"  
VCG: 20'-2 13/16"

STRUCTURAL FIT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_  
STRUCTURAL WELD:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_



BS02/BS01  
BUILD STAGE 01

SCALE	NONE	180PB001-U07-839-001	SHEET 20
DATE	TITLE	NO.	RS
B	U07-BS01.dwg		

BILL OF MATERIALS							
Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
07-LB01-P002	1	STEEL_0.375	N/A	N/A	N/A	130.157	NT3_B-006
07-LB01-P003	1	STEEL_0.25	N/A	N/A	N/A	3115.745	NT1_4-050
07-LB01-P004	1	STEEL_0.375	N/A	N/A	N/A	211.768	NT3_B-006
07-LB01-P005	1	STEEL_0.25	N/A	N/A	N/A	97.557	NT1_4-051
07-LB01-P006	1	STEEL_0.375	N/A	N/A	N/A	211.697	NT3_B-006
07-LB01-P007	1	STEEL_0.375	N/A	N/A	N/A	211.717	NT3_B-006
07-LB01-P008	1	STEEL_0.375	N/A	N/A	N/A	211.736	NT3_B-006
07-LB01-P010	1	STEEL_0.375	N/A	N/A	N/A	211.755	NT3_B-006
07-LB01-S001	2	L3.0x2.0x18.75	8 3/4"	E079	E020	2.057	N/A
07-LB01-S003	1	L3.0x2.0x18.75	34'-7 5/8"	E079	None	105.335	N/A
07-LB01-S004	1	L3.0x2.0x18.75	3'-10"	None	None	11.672	N/A
07-LB01-S006	1	L3.0x2.0x18.75	28'-7 7/8"	None	E079	87.129	N/A
07-LB01-S007	1	L3.0x2.0x18.75	8 3/4"	E020	E079	2.057	N/A
07-LB01-S009	1	L3.0x2.0x18.75	28'-7 7/8"	None	E079	87.129	N/A
07-LB01-S010	3	L3.0x2.0x18.75	2'-3"	E020	E020	6.772	N/A
07-LB01-S011	1	L9.0x4.0x500	8'-5"	None	None	177.362	N/A
BKT092	3	STEEL_0.25	N/A	N/A	N/A	4.014	NT1_4-046

ISOMETRIC VIEW  
N.T.S.

SECTION VIEW A  
LKG DWN - N.T.S.

STRUCTURAL FIT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

STRUCTURAL WELD:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

STRUCTURAL CUT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

STRUCTURAL FIT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

STRUCTURAL WELD:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

STRUCTURAL CUT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

Weight: 4909.29lb  
 LCG: -98'-1 1/4"  
 TCC: -1.6'-8 3/8"  
 VCG: 16'-2 1/16"

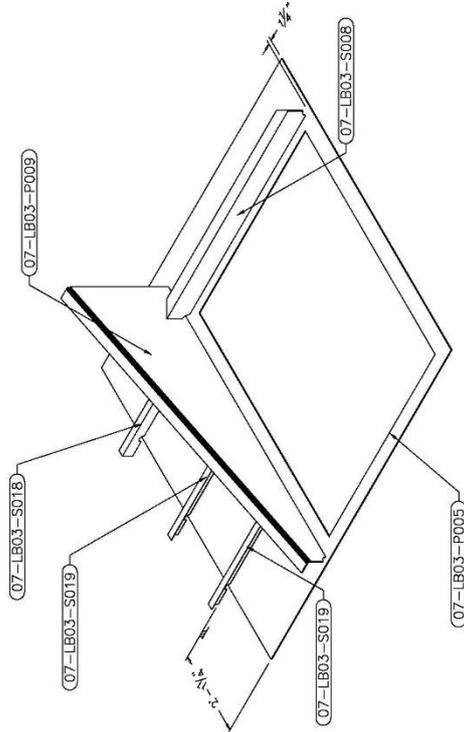
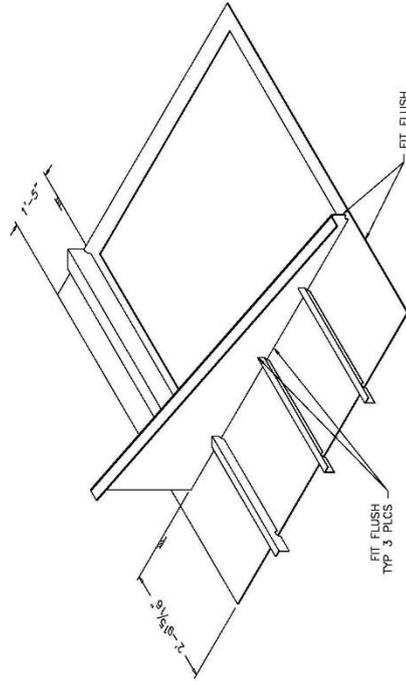
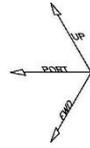
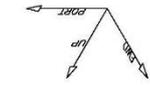
LB01+03/LB01  
 LBHD 17FT0 OCL FR58-58 S

U07-LB01.dwg  
 NONE  
 180PB001-U07-839-001

Sheet 21

**BILL OF MATERIALS**

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
07-LB03-P005	1	STEEL_0.375	N/A	N/A	N/A	215.871	N13_B-006
07-LB03-P009	1	STEEL_0.25	N/A	N/A	N/A	418.769	N11_4-053
07-LB03-S008	1	L6.0x3.5x.3125	5'-11.374"	E014	E014	57.016	N/A
07-LB03-S018	1	L3.0x2.0x.1675	3'-3.5/8"	None	E079	9.852	N/A
07-LB03-S019	2	L3.0x2.0x.1675	3'-3.5/8"	None	None	9.852	N/A



ISOMETRIC VIEW  
N.T.S.

ISOMETRIC VIEW  
N.T.S.

Weight: 721.21lb  
LCG: -120'-5.5/16"  
TCG: -16'-7.15/16"  
VCG: 16'-8.7/8"

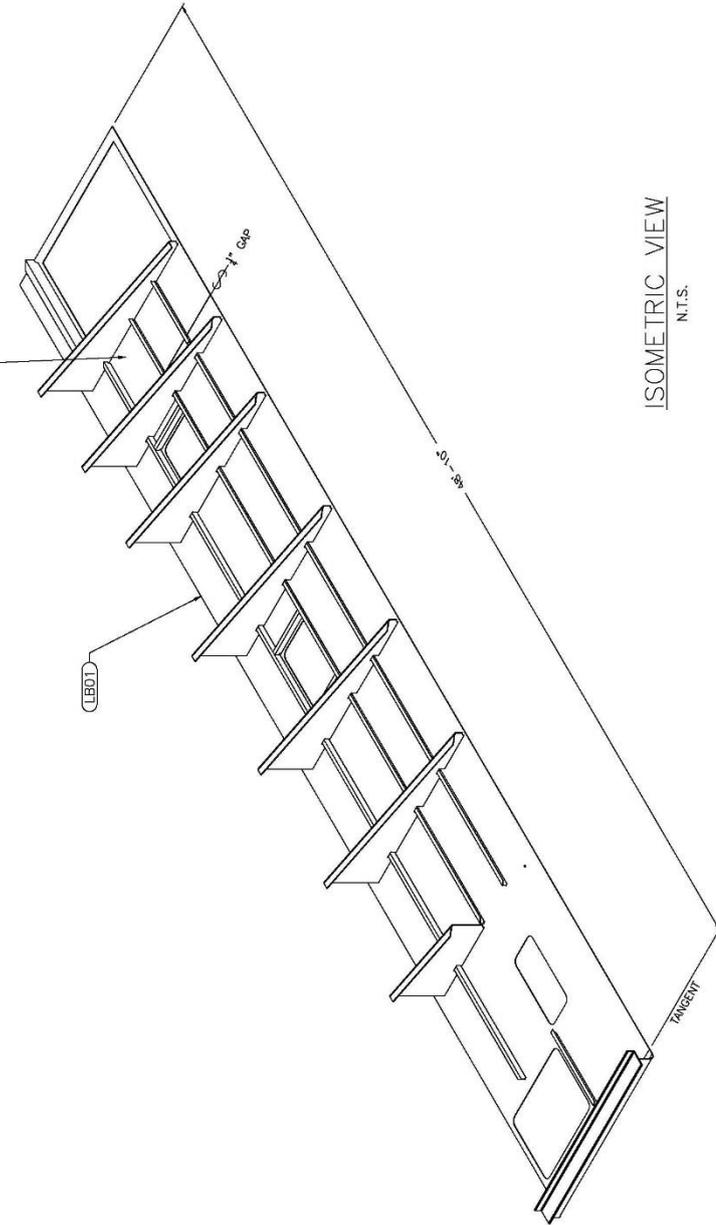
STRUCTURAL CUT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

STRUCTURAL FIT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

PROJECT NO.	LB01+03/LB03
DATE	LBHD 17FT0 OCL FR58-63 S
SCALE	U07-LB03.dwg
SCALE	NONE
PROJECT	180PB001-U07-839-001
SHEET	22

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
LB01	1	N/A	N/A	N/A	N/A	4909.288	N/A
LB03	1	N/A	N/A	N/A	N/A	721.21	N/A

**BILL OF MATERIALS**



ISOMETRIC VIEW  
N.T.S.

Weight: 5630.50lb  
 LCG: -100'-11 9/16"  
 TCC: -16'-8 5/16"  
 VCC: 16'-2 15/16"

STRUCTURAL FIT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL WELD:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

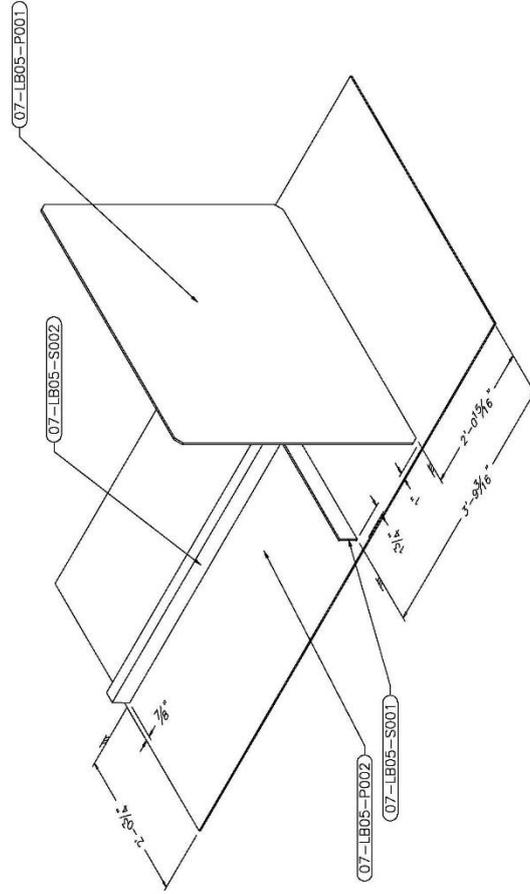
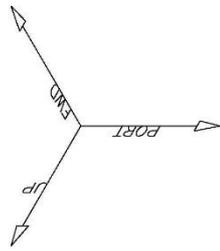
STRUCTURAL CUT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

LB01+03S/LB01+03  
 LBHD 17FT0 OCL FR38-63 S

SCALE	NONE	180PB001-U07-839-001	SHEET 23
DATE	TIME	NO.	REV.
B		U07-LB01+03.dwg	-

**BILL OF MATERIALS**

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
07-LB05-P001	1	STEEL 0.3125	N/A	N/A	N/A	175.423	NT5_16-005
07-LB05-P002	1	STEEL 0.25	N/A	N/A	N/A	356.416	NT1_4-049
07-LB05-S001	1	F83K5/16	3'-9 3/4"	None	None	12.162	N/A
07-LB05-S002	1	L3.0x2.0x.25	4'-7 3/16"	None	E020	18.405	N/A



**ISOMETRIC VIEW**

N.T.S.

STRUCTURAL FIT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_  
 STRUCTURAL WELD:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL CUT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

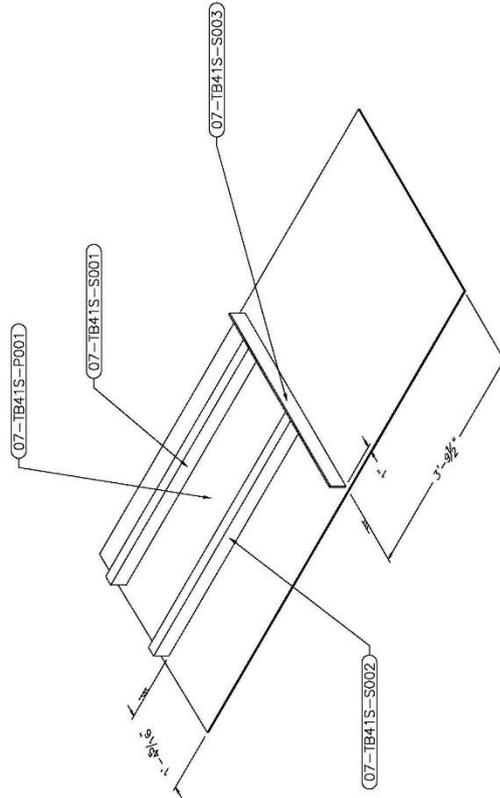
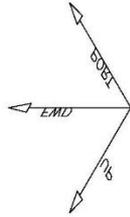
Weight: 562.41lb  
 LCG: -79'-11 15/16"  
 TCC: -14'-0 3/4"  
 VCC: 15'-5 3/4"

VT01/LB05  
 LONG BHD 13F16 S

SCALE	TWP NO	RS
B	U07-LB05.dwg	-
SCALE	NONE	SHEET 24

**BILL OF MATERIALS**

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
07-TB41S-P001	1	STEEL 0.25	N/A	N/A	N/A	297.616	NT1_4-049
07-TB41S-S001	1	L3.0x2.0x.25	4'-6 1/16"	None	E020	16.043	N/A
07-TB41S-S002	1	L3.0x2.0x.25	4'-5 3/4"	None	E020	17.935	N/A
07-TB41S-S003	1	FB3x5/16	3'-3 1/2"	None	None	10.501	N/A



**ISOMETRIC VIEW**

N.T.S.

STRUCTURAL ETC.  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_  
STRUCTURAL WELD:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

STRUCTURAL CUT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

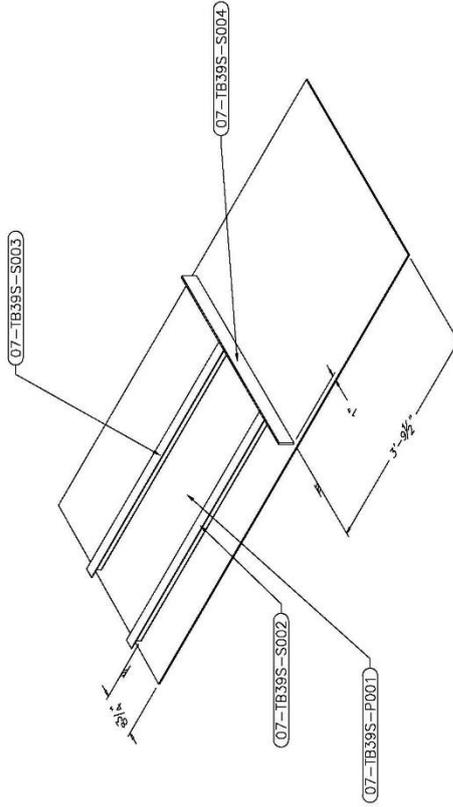
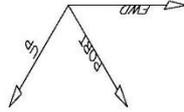
Weight: 344.09lb  
LCG: -81'-11 7/8"  
TCG: -15'-2 1/2"  
VCG: 16'-3 1/8"

VT01/TB41S  
TRANSV BHD FR41 S

SCALE	NONE	180PB001-U07-839-001	SHEET 25
DATE	U07-TB41S.dwg		
BY			
RS			

**BILL OF MATERIALS**

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
07-TB39S-P001	1	STEEL 0.25	N/A	N/A	N/A	297.616	NT1_4-049
07-TB39S-S002	1	L3.0x2.0x.25	4'-6 1/16"	E020	None	16.043	N/A
07-TB39S-S003	1	L3.0x2.0x.25	4'-5 3/4"	E020	None	17.935	N/A
07-TB39S-S004	1	FB3x5/16	3'-3 1/2"	None	None	10.501	N/A



ISOMETRIC VIEW  
N.T.S.

Weight: 344.09lb  
 LCG: -78'-0 1/8"  
 TCC: -15'-2 1/2"  
 VCC: 16'-3 1/8"

STRUCTURAL FIT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

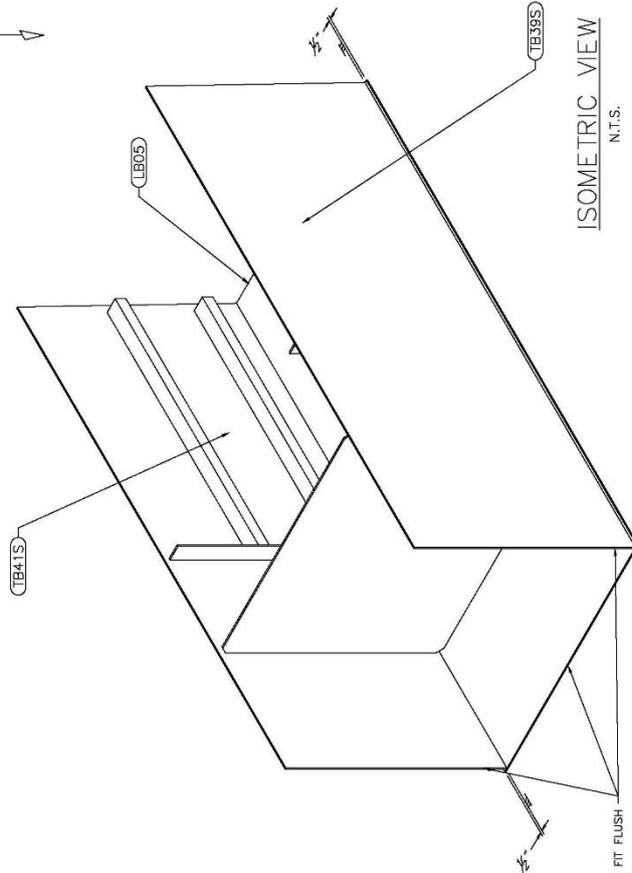
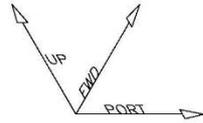
STRUCTURAL QUT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

VT01/TB39S  
 TRANSV BHD FR39 S

SCALE	NONE	180PB001-U07-839-001	SHEET 26
DATE	TWP NO	RS	
B	U07-TB39S.dwg		

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
LB05	1	N/A	N/A	N/A	N/A	562.406	N/A
TB39S	1	N/A	N/A	N/A	N/A	344.095	N/A
TB41S	1	N/A	N/A	N/A	N/A	344.095	N/A

**BILL OF MATERIALS**



ISOMETRIC VIEW  
N.T.S.

Weight: 1250.60lb  
 LCG: -80°-0"  
 TCC: -1.4'-8 5/16"  
 VCC: 15'-10 15/16"

STRUCTURAL FIT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL CUT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL WELD:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

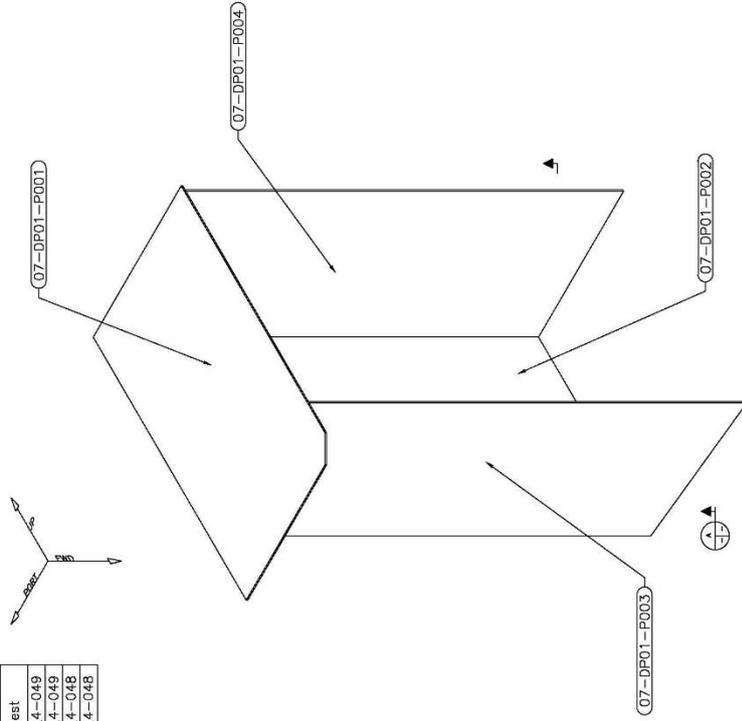
PROJECT: LB01+03S/VT01 VENT TRUNK SEAT S  
 DRAWING NO: U07-VT01.dwg  
 SCALE: NONE | 180PB001-U07-839-001

DATE: \_\_\_\_\_  
 BY: \_\_\_\_\_  
 CHECKED: \_\_\_\_\_  
 DESIGNED: \_\_\_\_\_  
 APPROVED: \_\_\_\_\_

REV: \_\_\_\_\_  
 SHEET 27

**BILL OF MATERIALS**

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
07-DP01-P001	1	STEEL 0.25	N/A	N/A	N/A	101.587	NT1_4-049
07-DP01-P002	1	STEEL 0.25	N/A	N/A	N/A	187.343	NT1_4-049
07-DP01-P003	1	STEEL 0.25	N/A	N/A	N/A	144.004	NT1_4-048
07-DP01-P004	1	STEEL 0.25	N/A	N/A	N/A	143.191	NT1_4-048



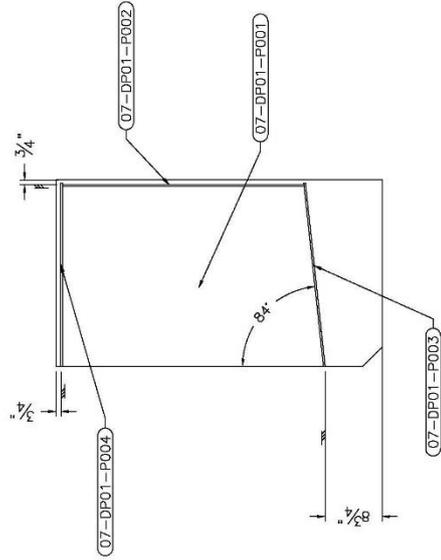
**ISOMETRIC VIEW**

N.T.S.

LB01+03S/DP01  
DRIP PAN S

SCALE	TYP NO	REV
B	U07-DP01.dwg	-
SCALE	NONE	180PB001-U07-839-001

SHEET 28



**SECTION VIEW A**

LKG AFT - N.T.S.

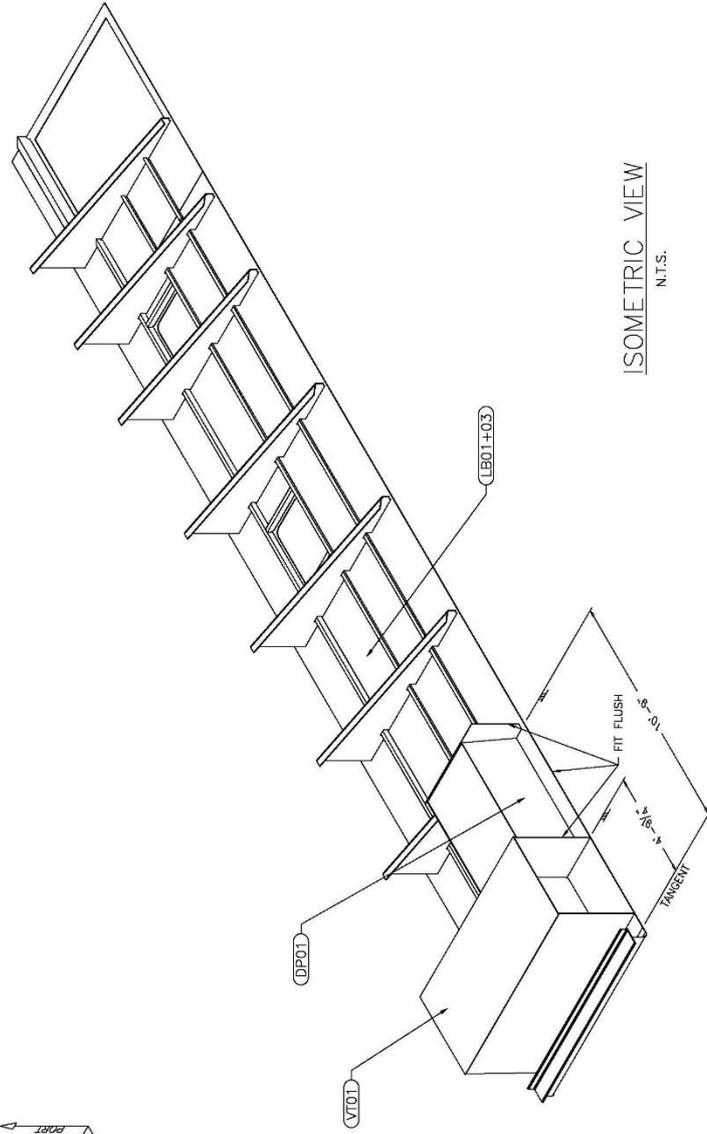
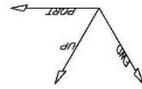
STRUCTURAL FIT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

STRUCTURAL CUT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

Weight: 576.32lb  
LCG: -85'-6 5/16"  
TCC: -15'-5 1/8"  
VCG: 14'-3 1/2"

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
DP01	1	N/A	N/A	N/A	N/A	576.325	N/A
LB01+03	1	N/A	N/A	N/A	N/A	5630.498	N/A
VT01	1	N/A	N/A	N/A	N/A	1248.795	N/A

**BILL OF MATERIALS**



ISOMETRIC VIEW  
N.T.S.

Weight: 7455.62lb  
 LCG: -96'-3 1/8"  
 TCC: -16'-3 1/8"  
 VCC: 16'-0 7/16"

STRUCTURAL CUT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

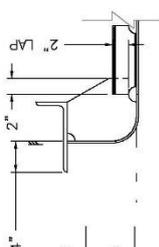
STRUCTURAL WELD:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL FIT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

BS02/LB01+03S  
 LBHD 17FT0 OCL S + VT & DP

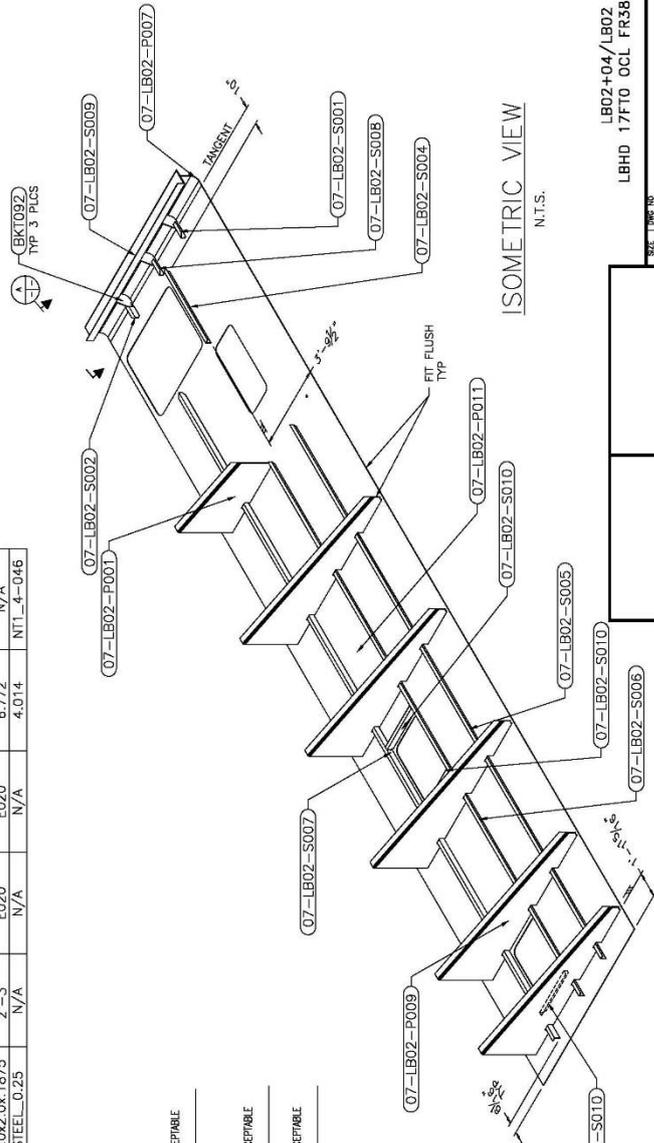
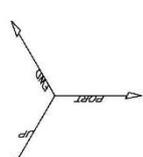
SCALE	NONE	180PB001-U07-839-001	SHEET 29
DATE	U07-LB01+03S.dwg		
REV			

BILL OF MATERIALS							
Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
07-LB02-P001	1	STEEL 0.375	N/A	N/A	N/A	130.157	NT3_B-007
07-LB02-P007	1	STEEL 0.25	N/A	N/A	N/A	97.557	NT1_4-051
07-LB02-P009	5	STEEL 0.375	N/A	N/A	N/A	211.771	NT3_B-006
07-LB02-P011	1	STEEL 0.25	N/A	N/A	N/A	3115.745	NT1_4-052
07-LB02-S001	1	L3.0x2.0x.1875	8 3/4"	E020	E079	2.057	N/A
07-LB02-S002	1	L3.0x2.0x.1875	8 3/4"	E079	E020	2.057	N/A
07-LB02-S004	1	L3.0x2.0x.1875	3'-10"	None	None	11.672	N/A
07-LB02-S005	1	L3.0x2.0x.1875	28'-7 7/8"	E079	None	87.129	N/A
07-LB02-S006	1	L3.0x2.0x.1875	28'-7 7/8"	E079	None	87.129	N/A
07-LB02-S007	1	L3.0x2.0x.1875	34'-7 5/8"	None	None	105.335	N/A
07-LB02-S008	1	L3.0x2.0x.1875	8 3/4"	E020	E079	2.057	N/A
07-LB02-S009	1	L9.0x4.0x.500	8'-5"	None	None	177.362	N/A
07-LB02-S010	3	L3.0x2.0x.1875	2'-3"	E020	E020	6.772	N/A
BKT092	3	STEEL 0.25	N/A	N/A	N/A	4.014	NT1_4-046



STRUCTURAL FIT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY:

STRUCTURAL WELD:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY:



STRUCTURAL FIT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY:

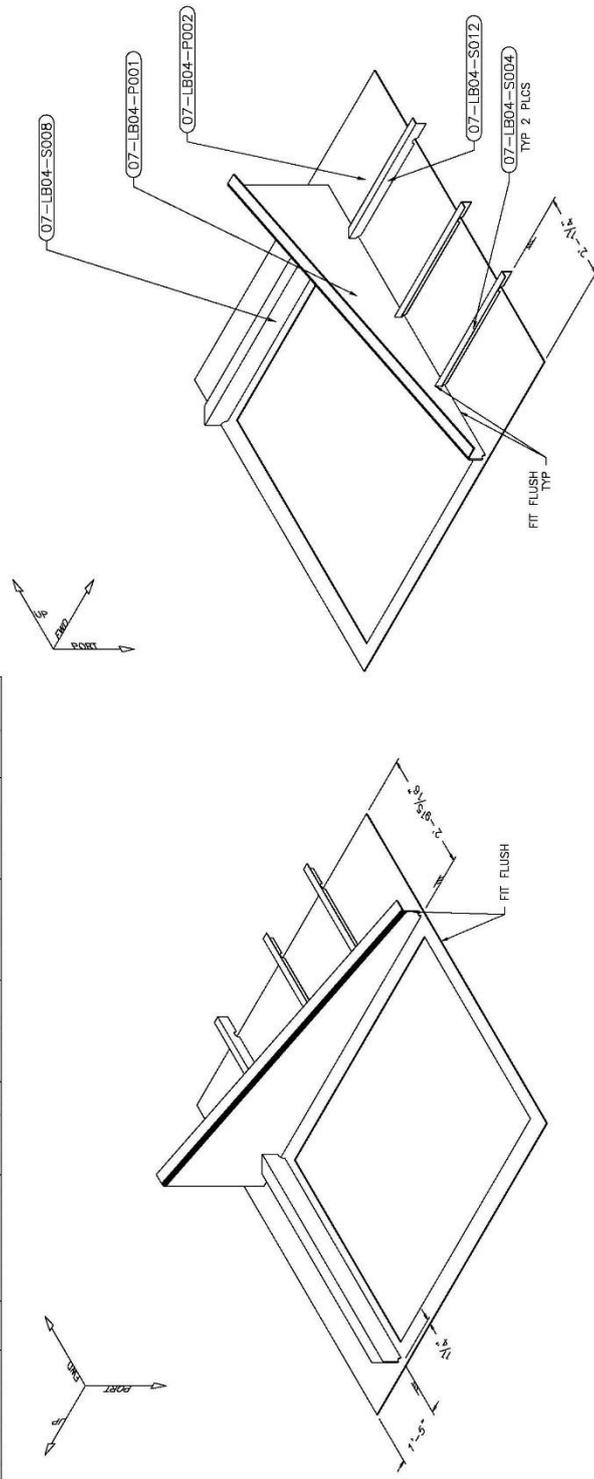
STRUCTURAL WELD:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY:

Weight: 4909.47lb  
LCG: -98°-1 1/4"  
TCG: 16'-8 3/8"  
VCG: 16'-2 1/16"

LB02+04/LB02  
LBHD 17F10 OCL FR58-58 P  
U07-LB02.dwg  
SCALE NONE 180PB001-U07-839-001 SHEET 30

**BILL OF MATERIALS**

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
07-LB04-P001	1	STEEL_0.375	N/A	N/A	N/A	215.871	N13_B-006
07-LB04-P002	1	STEEL_0.25	N/A	N/A	N/A	418.769	N11_4-053
07-LB04-S004	2	L3.0x2.0x.1875	3'-3 5/8"	None	E079	9.852	N/A
07-LB04-S008	1	L6.0x3.5x.3125	5'-11 3/4"	E014	E014	57.016	N/A
07-LB04-S012	1	L3.0x2.0x.1875	3'-3 5/8"	None	E079	9.852	N/A



ISOMETRIC VIEW  
N.T.S.

ISOMETRIC VIEW  
N.T.S.

Weight: 721.21lb  
 LCG: -120'-5 5/16"  
 TCC: 16'-7 15/16"  
 VCC: 16'-8 7/8"

STRUCTURAL FIT: \_\_\_\_\_  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL WELD: \_\_\_\_\_  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

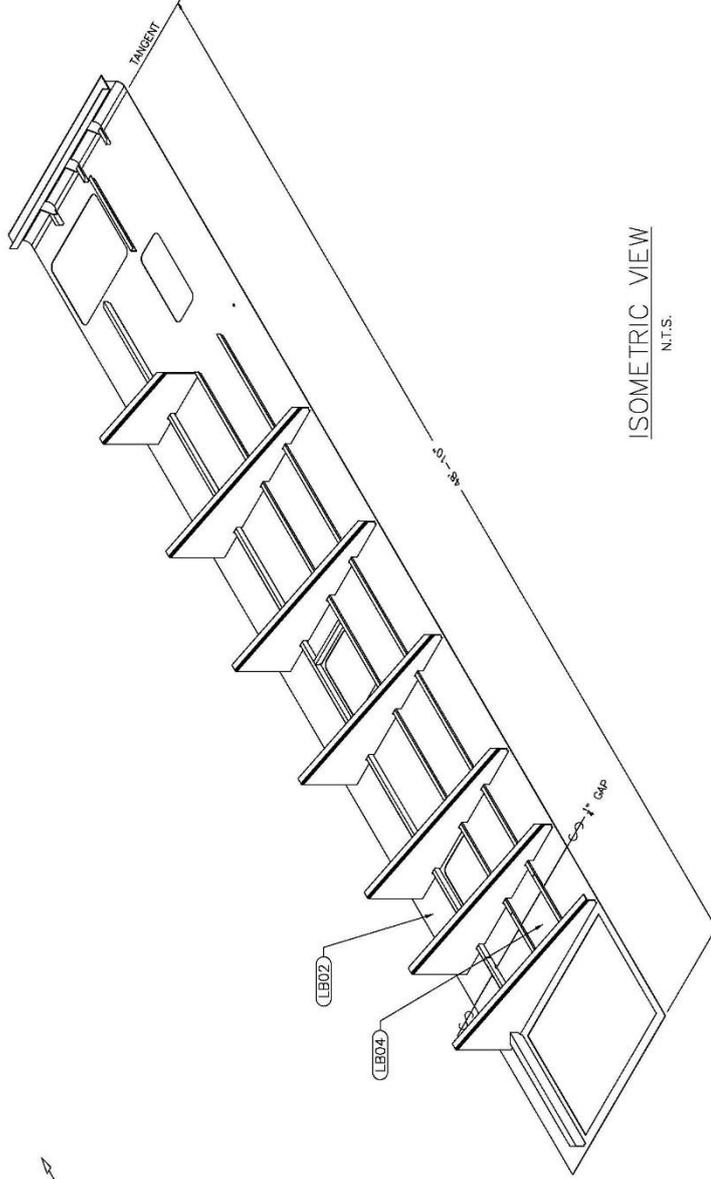
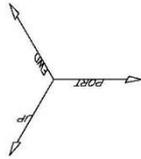
STRUCTURAL CUT: \_\_\_\_\_  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

LB02+04/LB04  
 LBHD 17FT0 OCL FR58-63 P

U07-LB04.dwg

SCALE NONE 180PB001-U07-839-001 SHEET 31

BILL OF MATERIALS							
Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
LB02	1	N/A	N/A	N/A	N/A	4909.47	N/A
LB04	1	N/A	N/A	N/A	N/A	721.21	N/A



ISOMETRIC VIEW

N.T.S.

STRUCTURAL FIT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_  
 STRUCTURAL WELD:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL CUT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

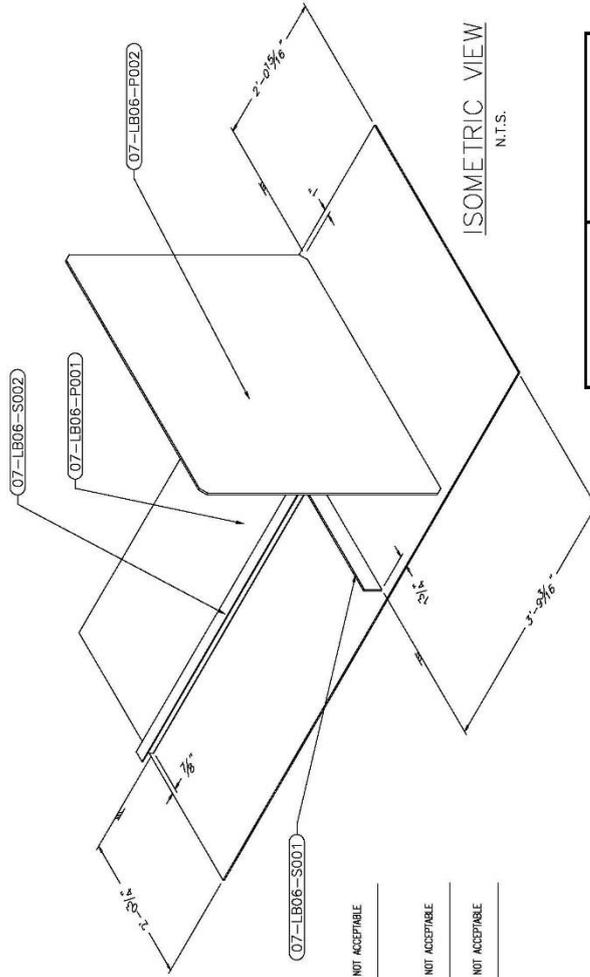
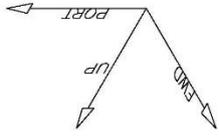
Weight: 5630.68lb  
 LCG: -100'-11 9/16"  
 TCC: 16'-8 5/16"  
 VCC: 16'-2 15/16"

LB02+04P/LB02+04  
 LBHD 17F10 OCL FR38-63 P

SCALE	NONE	180PB001-U07-839-001	SHEET 32
REV	B	U07-LB02+04.dwg	

**BILL OF MATERIALS**

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
07-LB06-P001	1	STEEL_0.25	N/A	N/A	N/A	356.416	NT1_4-053
07-LB06-P002	1	STEEL_0.3125	N/A	N/A	N/A	175.423	NT5_16-005
07-LB06-S001	1	FB3x5/16	3'-9 3/4"	None	None	12.162	N/A
07-LB06-S002	1	L3.0x2.0x.25	4'-7 3/16"	E020	None	18.405	N/A



STRUCTURAL CUT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL FIT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

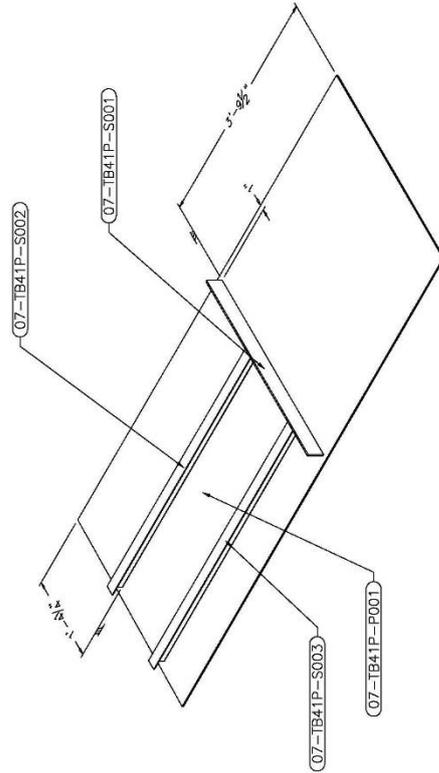
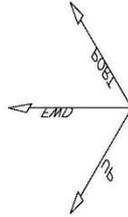
STRUCTURAL WELD:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

Weight: 562.41lb  
 LCG: -79°-11 15/16"  
 TCC: 14'-0 3/4"  
 VCC: 15'-5 3/4"

VT02/LB06		REV	
LONG BHD 13F16 P		DATE	
B	U07-LB06.dwg	TIME	
SCALE	NONE	NO	
180PB001-U07-839-001		SHEET 33	

**BILL OF MATERIALS**

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
07-TB41P-P001	1	STEEL 0.25	N/A	N/A	N/A	297.616	NTL-4-049
07-TB41P-S001	1	FB3x5/16	3'-3 1/2"	None	None	10.501	N/A
07-TB41P-S002	1	L3.0x2.0x.25	4'-5 3/4"	E020	None	17.935	N/A
07-TB41P-S003	1	L3.0x2.0x.25	4'-6 1/16"	E020	None	18.043	N/A



**ISOMETRIC VIEW**

N.T.S.

Weight: 344.09lb  
 LCG: -81'-11 7/8"  
 TCG: 15'-2 1/2"  
 VCG: 16'-3 1/8"

STRUCTURAL CUT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

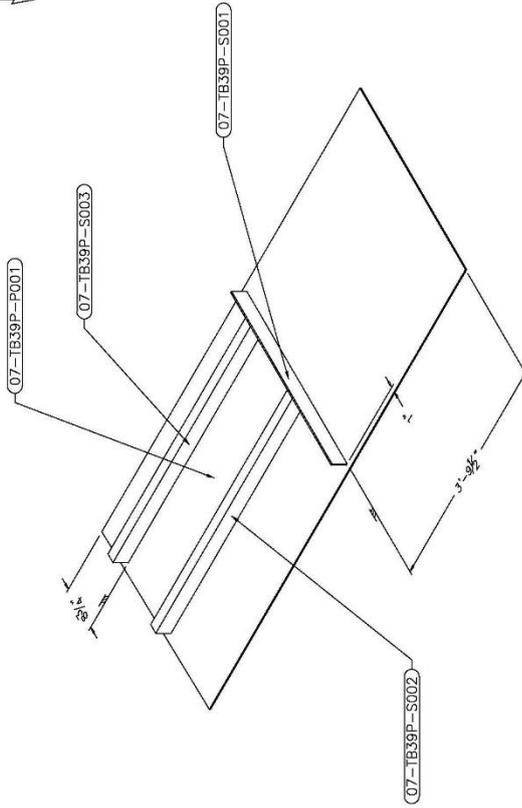
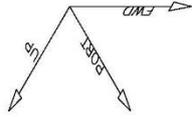
STRUCTURAL FIT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL WELD:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

VT02/TB41P TRANSV BHD FR41 P	
SCALE	NONE
DATE	180PB001-U07-839-001
REV	
B	U07-TB41P.dwg
SHEET 34	

**BILL OF MATERIALS**

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
07-TB39P-P001	1	STEEL-0.25	N/A	N/A	N/A	297.616	NTL-4-049
07-TB39P-S001	1	FB3x5/16	3'-3 1/2"	None	None	10.501	N/A
07-TB39P-S002	1	L3.0x2.0x.25	4'-5 3/4"	None	E020	17.935	N/A
07-TB39P-S003	1	L3.0x2.0x.25	4'-6 1/16"	None	E020	18.043	N/A



**ISOMETRIC VIEW**  
N.T.S.

Weight: 344.09lb  
 LCG: -78'-0 1/8"  
 TCC: 15'-2 1/2"  
 VCC: 16'-3 1/8"

STRUCTURAL CUT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL FIT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_  
 STRUCTURAL WELD:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

VT02/TB39P TRANSV BHD FR39 P	
SCALE	NONE
DATE	180PB001-U07-839-001
BY	U07-TB39P.dwg
REV	-
SHEET 35	

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
LB06	1	N/A	N/A	N/A	N/A	562.406	N/A
TB39P	1	N/A	N/A	N/A	N/A	344.095	N/A
TB41P	1	N/A	N/A	N/A	N/A	344.095	N/A

**BILL OF MATERIALS**

**ISOMETRIC VIEW**  
N.T.S.

FIT FLUSH

Weight: 1250.60lb  
 LCG: -80°-0°  
 TCC: 14'-8 5/16"  
 VCC: 15'-10 15/16"

STRUCTURAL FIT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL CUT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL FIT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL WELD:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

PROJECT: LB02+04P/VT02  
 VENT TRUNK SEAT P

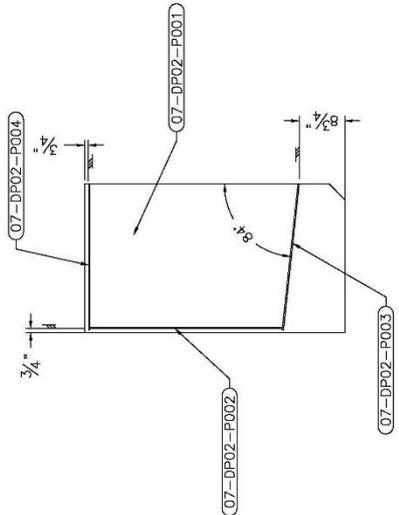
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REV: \_\_\_\_\_

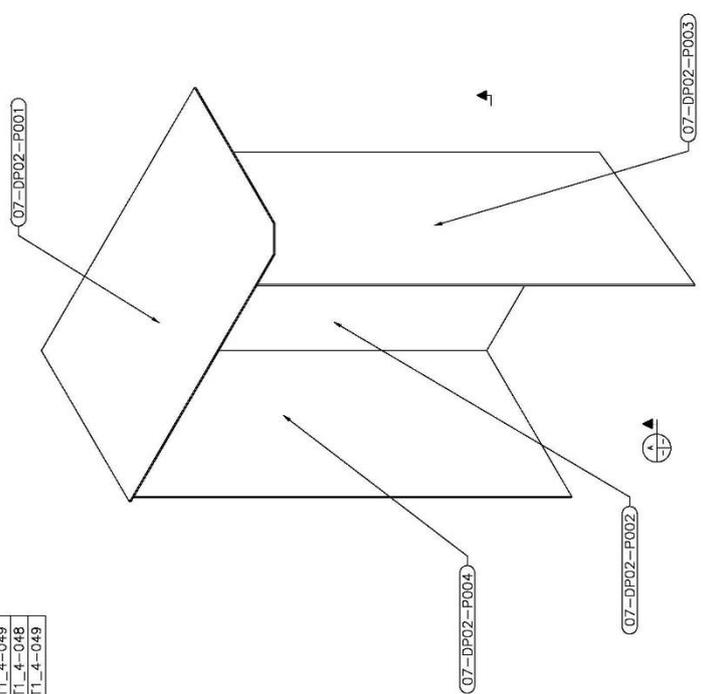
SCALE: NONE | 180PB001-U07-839-001 | SHEET 36

**BILL OF MATERIALS**

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
07-DP02-P001	1	STEEL 0.25	N/A	N/A	N/A	101.587	NT1_4-049
07-DP02-P002	1	STEEL 0.25	N/A	N/A	N/A	187.343	NT1_4-049
07-DP02-P003	1	STEEL 0.25	N/A	N/A	N/A	144.004	NT1_4-048
07-DP02-P004	1	STEEL 0.25	N/A	N/A	N/A	143.191	NT1_4-049



**SECTION VIEW A**  
LKG AFT - N.T.S.



**ISOMETRIC VIEW**  
N.T.S.

Weight: 576.32lb  
 LCG: -85'-6 5/16"  
 TCC: 15'-5 1/8"  
 VCC: 14'-3 1/2"

STRUCTURAL FIT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL CUT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL WELD:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

LB02+04P/DP02  
 DRIP PAN P

U07-DP02.dwg

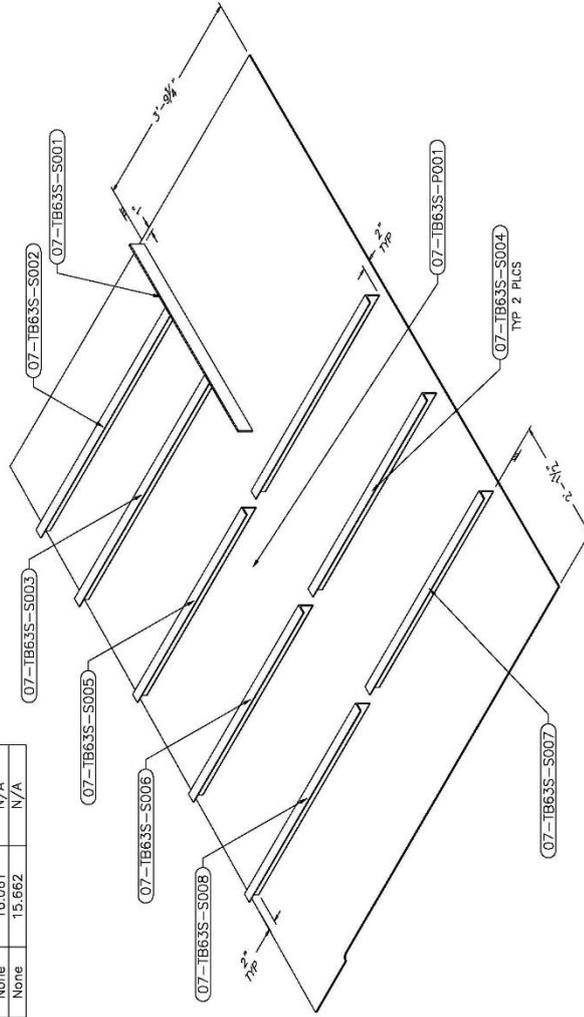
SCALE NONE 180PB001-U07-839-001

DATE TIME NO	RS
B	U07-DP02.dwg
SCALE	NONE
180PB001-U07-839-001	
SHEET 37	



**BILL OF MATERIALS**

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
07-TB63S-P001	1	STEEL 0.25	N/A	N/A	N/A	943.024	NT1-4-053
07-TB63S-S001	1	FB3x5/16	3'-9 3/4"	None	None	12.182	N/A
07-TB63S-S002	1	L3.0x2.0x.25	4'-6 1/2"	EO20	None	18.196	N/A
07-TB63S-S003	1	L3.0x2.0x.25	4'-6 13/16"	EO20	None	18.294	N/A
07-TB63S-S004	2	L3.0x2.0x.25	4'	None	None	16.061	N/A
07-TB63S-S005	1	L3.0x2.0x.25	3'-9 7/8"	None	None	15.347	N/A
07-TB63S-S006	1	L3.0x2.0x.25	3'-10 5/16"	None	None	15.504	N/A
07-TB63S-S007	1	L3.0x2.0x.25	4'	None	None	16.061	N/A
07-TB63S-S008	1	L3.0x2.0x.25	3'-10 13/16"	None	None	15.662	N/A



STRUCTURAL FIT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL WELD:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL CUT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

Weight: 1086.36lb  
 LCG: -126'-0 1/8"  
 TCC: -11'-6 3/4"  
 VCC: 16'-2 1/8"

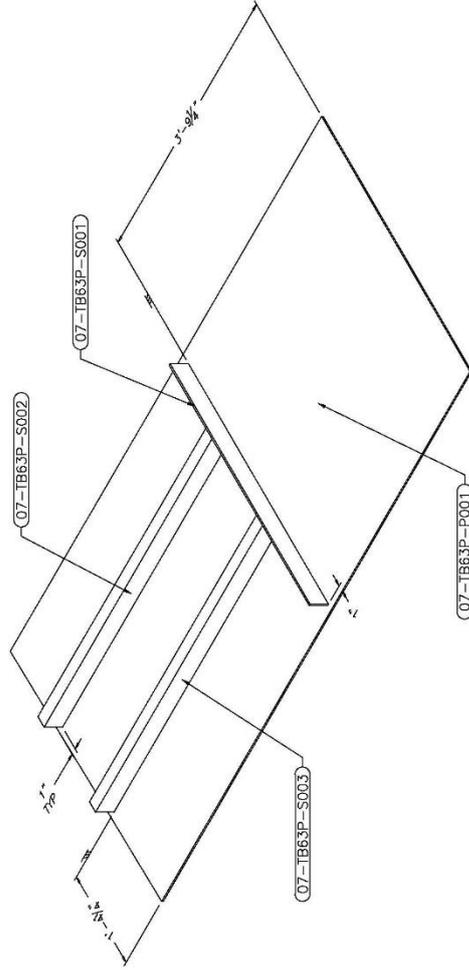
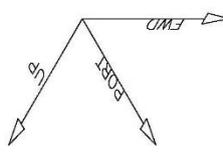
BS02/TB63S  
 BHD FR63 S

U07-TB63S.dwg

SCALE NONE 180PB001-U07-839-001 SHEET 39

**BILL OF MATERIALS**

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
07-TB63P-P001	1	STEEL 0.25	N/A	N/A	N/A	348.053	NT1_4-053
07-TB63P-S001	1	FB3x5/16	3'-9 3/4"	None	None	12.162	N/A
07-TB63P-S002	1	L3.0x2.0x.25	4'-6 13/16"	None	E020	18.294	N/A
07-TB63P-S003	1	L3.0x2.0x.25	4'-6 1/2"	None	E020	18.186	N/A



STRUCTURAL FIT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL WELD:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL CUT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

Weight: 396.691lb  
 LCG: -126'-0 1/8"  
 TCC: 14'-11 7/16"  
 VCC: 16'-2 7/8"

BS02/TB63P  
 BHD FR63 P

U07-TB63P.dwg

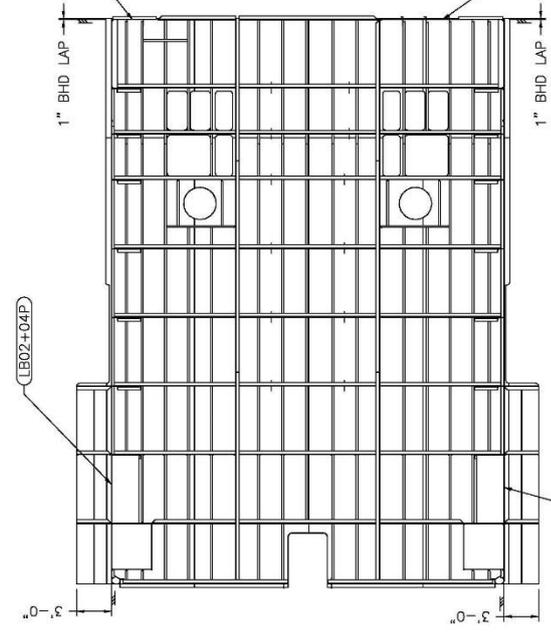
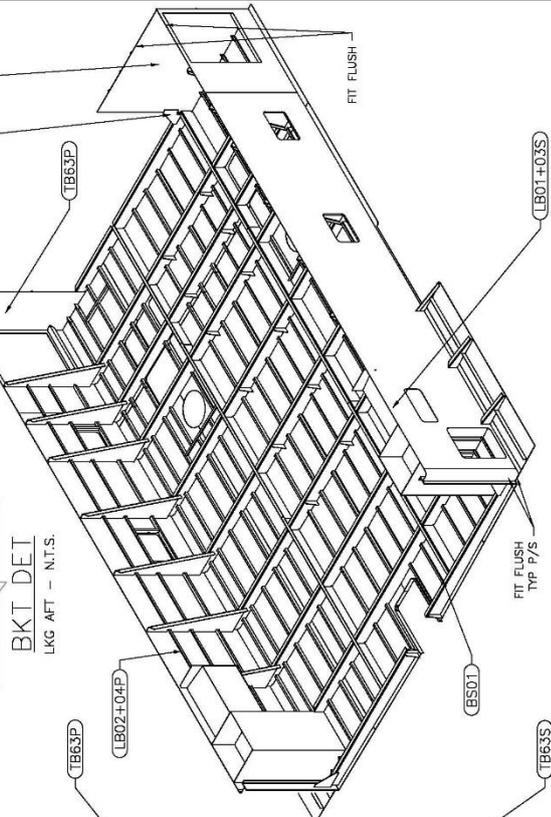
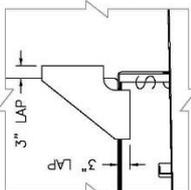
SCALE NONE 180PB001-U07-839-001 SHEET 40

**BILL OF MATERIALS**

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
BS01	1	N/A	N/A	N/A	N/A	28664.453	N/A
LB01+03S	1	N/A	N/A	N/A	N/A	7455.618	N/A
LB02+04P	1	N/A	N/A	N/A	N/A	7455.618	N/A
TB63P	1	N/A	N/A	N/A	N/A	396.694	N/A
TB63S	1	N/A	N/A	N/A	N/A	1086.36	N/A
07-DK03-P031	1	STEEL_0.3125	N/A	N/A	N/A	19.445	NTS_16-005

STRUCTURAL FIT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

STRUCTURAL WELD:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_



Weight: 45278.37lb  
 LCG: -99'-11 1/4"  
 TCC: -1 7/16"  
 VCC: 18'-8 5/8"

STRUCTURAL FIT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

STRUCTURAL WELD:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

STRUCTURAL FIT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

STRUCTURAL WELD:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

NO. 1	U07-BS02.dwg	180PB001-U07-839-001	SHEET 41
B	U07-BS02.dwg		
SCALE	NONE		

BS03/BS02  
 BUILD STAGE 02



**BILL OF MATERIALS**

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
BS02	1	N/A	N/A	N/A	N/A	45278.371	N/A
SN01	1	N/A	N/A	N/A	N/A	1543.944	N/A
07-DK01-F002	1	FB6x1/4	8'-1"	None	None	41.259	N/A
07-DK01-F003	1	FB6x1/4	17'-0 1/2"	None	None	86.984	N/A
07-DK01-P007	1	STEEL_0.25	N/A	N/A	N/A	13.826	NTL_4-051
07-DK01-P010	1	STEEL_0.25	N/A	N/A	N/A	35.245	NTL_4-051
07-DK01-S063	1	FB2x1/4	14'-5 3/4"	None	None	24.631	N/A
07-DK02-F002	1	FB6x1/4	8'-1"	None	None	41.259	N/A
07-DK02-F003	1	FB6x1/4	17'-0 1/2"	None	None	86.984	N/A
07-DK02-P001	1	STEEL_0.25	N/A	N/A	N/A	13.826	NTL_4-051
07-DK02-P019	1	STEEL_0.25	N/A	N/A	N/A	35.245	NTL_4-051
07-DK02-S048	1	FB2x1/4	14'-5 3/4"	None	None	24.631	N/A
07-DK03-F002	1	FB6x1/4	23'-5 3/4"	None	None	119.639	N/A
07-DK04-F001	1	FB6x1/4	23'-5 3/4"	None	None	119.639	N/A
07-LB01-S012	1	FB2x1/4	8'-5 1/2"	None	None	14.389	N/A
07-LB02-S023	1	FB2x1/4	8'-5 1/2"	None	None	14.389	N/A
BKT095	10	STEEL_0.3125	N/A	N/A	N/A	1.191	NTS_1B-005

STRUCTURAL FIT: \_\_\_\_\_  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

STRUCTURAL WELD: \_\_\_\_\_  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

STRUCTURAL CUT: \_\_\_\_\_  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

**ISOMETRIC VIEW**

N.T.S.

**COAMING DET**

LKG AFT - N.T.S.

**DET A**

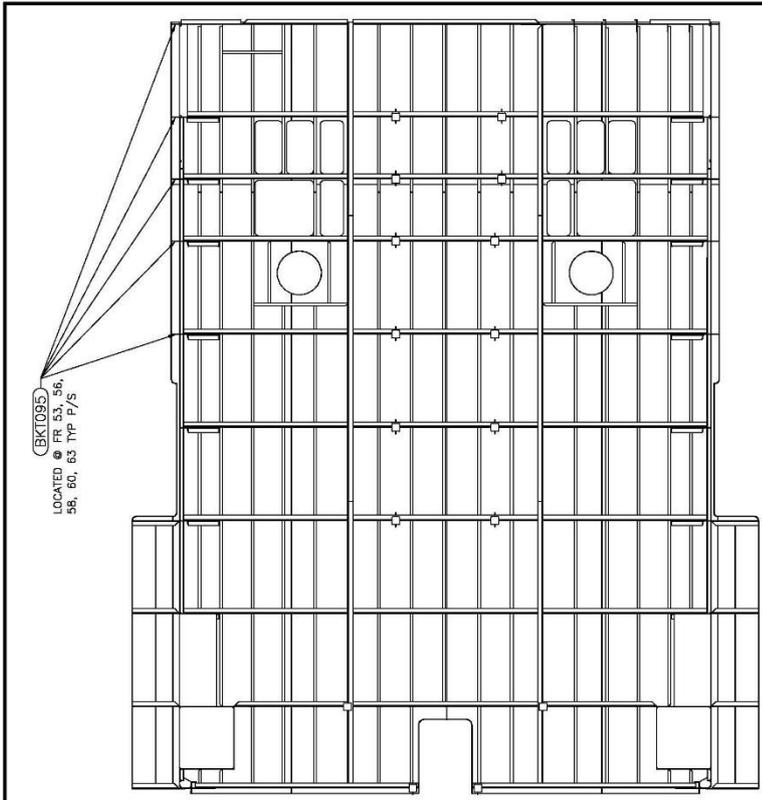
LKG AFT - N.T.S.

Weight: 47506.57lb  
LCG: -99'-10 15/16"  
TCC: -1 3/8"  
VCC: 18'-7 11/16"

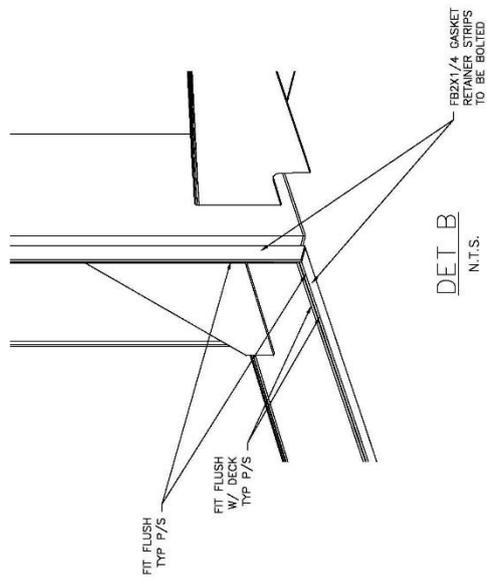
BS04/BS03  
BUILD STAGE 03

SCALE: NONE | 180PB001-U07-839-001 | SHEET 43



**BKT095**  
 LOCATED @ FR 53, 56,  
 95, 60, 63 TYP P/S

PLAN VIEW  
 LKG UP - N.T.S.



DET B  
 N.T.S.

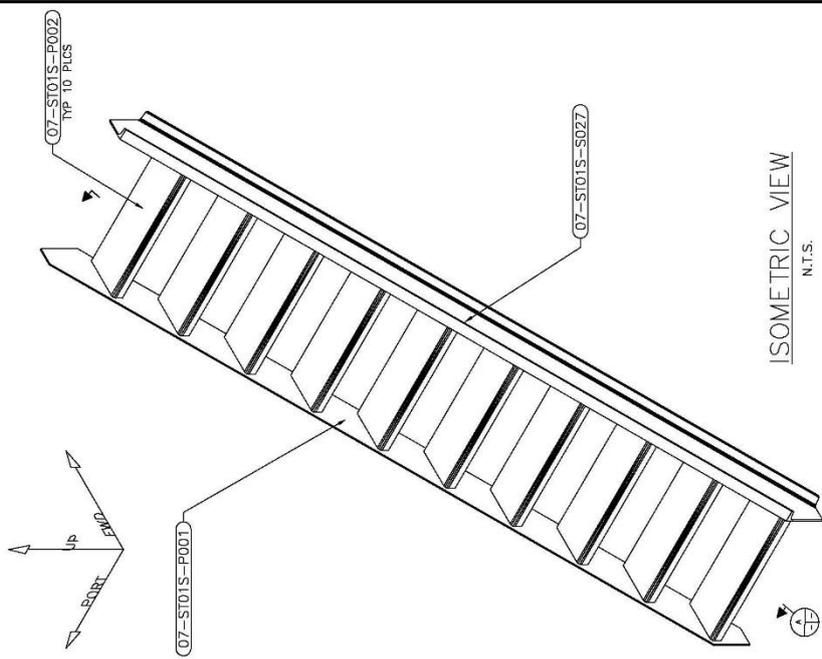
SCALE	TYPING NO.	RS
B	U07-BS03.dwg	-
SCALE	NONE	180PB001-U07-839-001
		SHEET 43A

BS04/BS03  
 BUILD STAGE 03

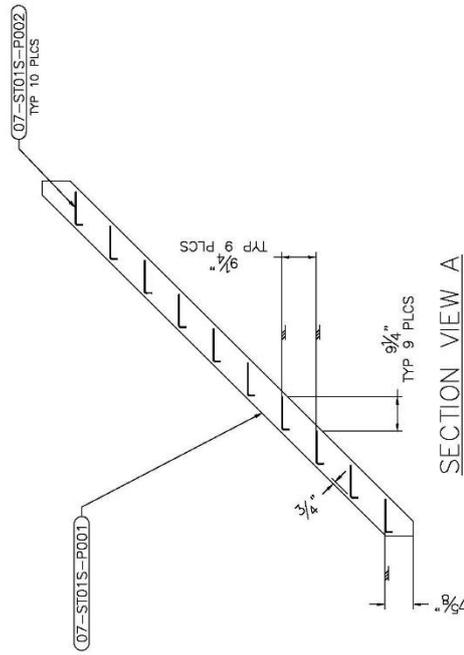
Weight: 47506.57lb  
 LCG: -99'-10 15/16"  
 TCC: -1 3/8"  
 VCC: 18'-7 11/16"

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
07-ST01S-P001	1	STEEL_0.25	N/A	N/A	N/A	76.068	NT1_4-049
07-ST01S-P002	10	STEEL_0.25_DIAMOND	N/A	N/A	N/A	22.38	NT1_4_DIAMOND-003
07-ST01S-S027	1	CBX13.75#	11'-7 7/16"	None	None	151.937	N/A

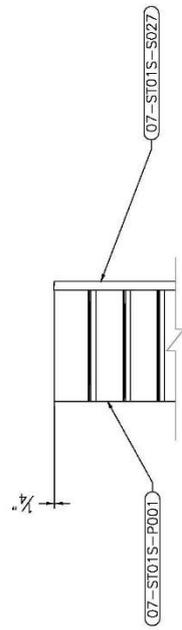
**BILL OF MATERIALS**



ISOMETRIC VIEW  
N.T.S.



SECTION VIEW A  
LKG PORT - N.T.S.



ELEVATION VIEW  
LKG FWD - N.T.S.

Weight: 451.80lb  
 LCG: -98'-1 3/4"  
 TCC: -18'-5 15/16"  
 VCG: 15'-11 7/8"

STRUCTURAL FIT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL WELD:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

B504/ST01S  
 INCLINED LADDER S

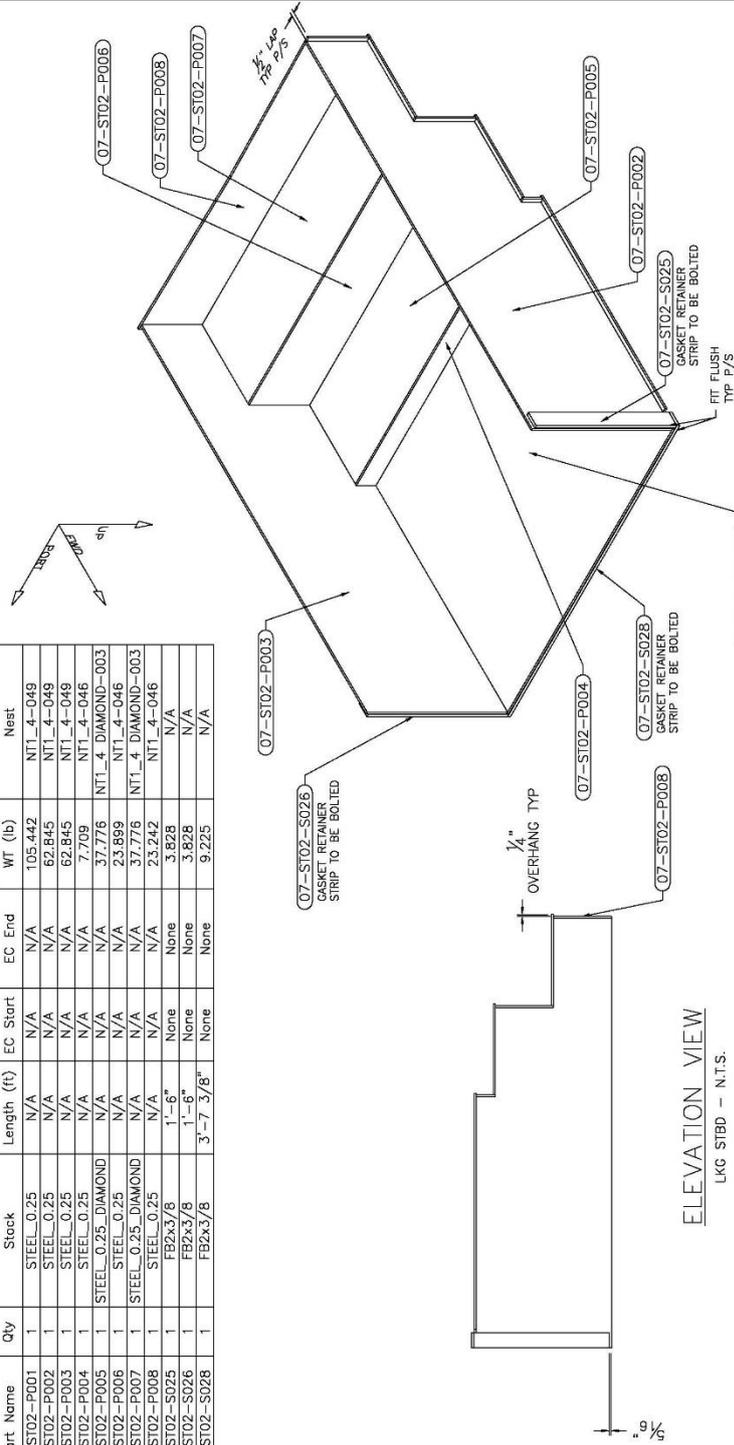
SCALE	TITLE NO	REV
B	U07-ST01S.dwg	-
SCALE	NONE	180PB001-U07-839-001

SHEET 44



**BILL OF MATERIALS**

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
07-ST02-P001	1	STEEL_0.25	N/A	N/A	N/A	105.442	NT1_4-048
07-ST02-P002	1	STEEL_0.25	N/A	N/A	N/A	62.845	NT1_4-048
07-ST02-P003	1	STEEL_0.25	N/A	N/A	N/A	62.845	NT1_4-048
07-ST02-P004	1	STEEL_0.25	N/A	N/A	N/A	7.709	NT1_4-046
07-ST02-P005	1	STEEL_0.25_DIAMOND	N/A	N/A	N/A	37.776	NT1_4 DIAMOND-003
07-ST02-P006	1	STEEL_0.25	N/A	N/A	N/A	23.899	NT1_4-046
07-ST02-P007	1	STEEL_0.25_DIAMOND	N/A	N/A	N/A	37.776	NT1_4 DIAMOND-003
07-ST02-P008	1	STEEL_0.25	N/A	N/A	N/A	23.242	NT1_4-046
07-ST02-S025	1	FB2x3/8	1'-6"	None	None	3.828	N/A
07-ST02-S026	1	FB2x3/8	1'-6"	None	None	3.828	N/A
07-ST02-S028	1	FB2x3/8	3'-7 3/8"	None	None	9.225	N/A



**ISOMETRIC VIEW**

N.T.S.

**ELEVATION VIEW**

LKG STBD - N.T.S.

Weight: 378.42lb  
 LCG: -78"-10 9/16"  
 TCC: 0"  
 VCC: 21'-7 1/16"

STRUCTURAL FIT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL CUT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

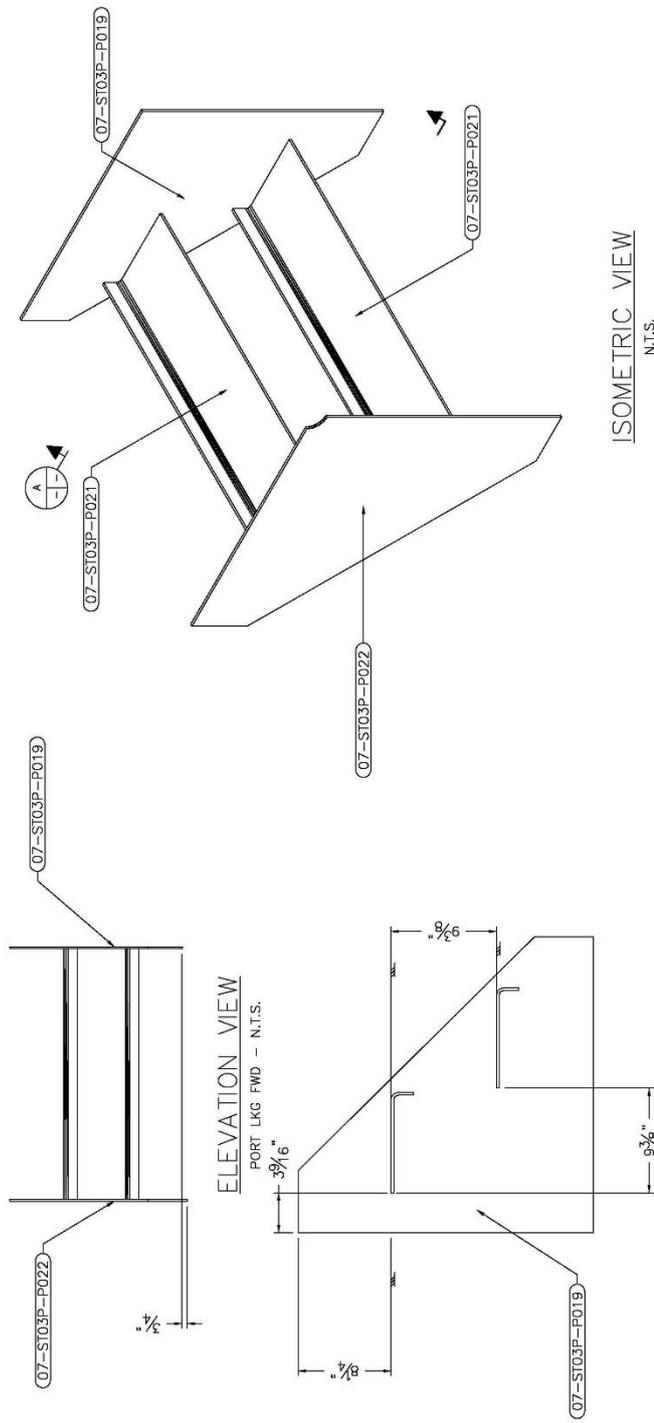
STRUCTURAL WELD:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

BS04/ST02  
 UPPER DK STAIR CL

DATE	TITLE NO	SCALE	SHEET NO
B	U07-ST02.dwg	NONE	180PB001-U07-839-001
			SHEET 46



BILL OF MATERIALS						
Part Name	Qty	Stock	Length (ft)	EC Start	EC End	Nest
07-ST03P-P019	1	STEEL_0.25	N/A	N/A	N/A	NT1_4-049
07-ST03P-P021	2	STEEL_0.25_DIAMOND	N/A	N/A	N/A	NT1_4 DIAMOND-003
07-ST03P-P022	1	STEEL_0.25	N/A	N/A	N/A	NT1_4-049



ISOMETRIC VIEW  
N.T.S.

SECTION VIEW A

Weight: 126.17lb  
 LCG: -77'-8 1/2"  
 TCG: 17'-10 11/16"  
 VCG: 21'-3"

STRUCTURAL FIT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL CUT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

B504/ST03P  
 UPPER DK STAIR P

SCALE	NONE	180PB001-U07-839-001	SHEET 48
DATE	10/10/16		
BY	U07-ST03P.dwg		
RS			





**APPENDIX K**

ID No.	Assy Name	Part Name	Qty	Stock	Thickn ess (in)	Length (in)	EndCut Start	EndCut End	Part Weight (lbs)	Part Area (in^2) - One Side	Plate Nest Name	Part Nest Cut Length (in)	Part Flanged Length (in)
0.01	DK01+S/DK01	07-DK01-P002	1	STEEL 0.25	0.2500		N/A	N/A	3734.361	52677.34	NT1 4-055	1,292.75	
0.02	DK01+S/DK01	07-DK01-P009	1	STEEL 0.25	0.2500		N/A	N/A	460.137	6490.75	NT1 4-048	480.97	
0.03	DK01+S/DK01	07-DK01-P023	1	STEEL 0.25	0.2500		N/A	N/A	2864.420	40405.86	NT1 4-047	1,129.85	
0.04	DK01+S/DK01SP	07-DK01-P039	1	SP MARKING 0.25	0.2500		N/A	N/A	0.000	99726.75	NT_SP MARKING 1 4-016		
0.05	DK01+G/DK01+S	DK01	1	N/A			N/A	N/A	7058.918		N/A		
0.06	DK01+G/DK01+S	DK01SP					N/A	N/A	0.000				
0.07	DK01+G/DK01+S	07-DK01-S001	2	L3.0x2.0x.25	0.2500	397.50	none	E079	132.843		N/A		
0.08	DK01+G/DK01+S	07-DK01-S002	3	L3.0x2.0x.25	0.2500	460.38	none	E079	153.880		N/A		
0.09	DK01+G/DK01+S	07-DK01-S003	1	L3.0x2.0x.25	0.2500	48.00	E079	E020	15.848		N/A		
0.10	DK01+G/DK01+S	07-DK01-S004	1	L3.0x2.0x.25	0.2500	48.00	E020	E079	15.848		N/A		
0.11	DK01+G/DK01+S	07-DK01-S007	1	L3.0x2.0x.25	0.2500	374.38	E002	E079	124.856		N/A		
0.12	DK01+G/DK01+S	07-DK01-S008	1	L3.0x2.0x.25	0.2500	72.05	E020	E079	23.787		N/A		
0.13	DK01+G/DK01+S	07-DK01-S009	1	L3.0x2.0x.25	0.2500	37.38	none	E079	12.347		N/A		
0.14	DK01+G/DK01+S	07-DK01-S016	1	L3.0x2.0x.25	0.2500	374.38	E002	E079	124.856		N/A		
0.15	DK01+G/DK01+S	07-DK01-S036	1	L3.0x2.0x.25	0.2500	14.38	E079	E079	4.493		N/A		
0.16	DK01+G/DK01+S	07-DK01-S050	2	L3.0x2.0x.25	0.2500	46.00	none	none	15.391		N/A		
0.17	DK01+G/DK01+S	07-DK01-S051	1	L3.0x2.0x.25	0.2500	14.38	E079	E079	4.493		N/A		
0.18	DK01+G/DK01+S	07-DK01-S054	1	FB4x1/4	0.2500	71.75	E020	E020	20.234		N/A		
0.19	DK01+G/DK01+S	07-DK01-S055	1	FB4x1/4	0.2500	71.50	E020	E020	20.164		N/A		
0.20	DK01+G/DK01+S	07-DK01-S056	1	FB4x1/4	0.2500	63.00	E020	E020	17.753		N/A		
0.21	DK01+03/DK01+G	DK01+S	1	N/A			N/A	N/A	8201.706		N/A		
0.22	DK01+03/DK01+G	07-DK01-F001	1	FB4x1/4	0.2500	74.88	none	none	21.221		N/A		
0.23	DK01+03/DK01+G	07-DK01-P003	1	STEEL 0.375	0.3750	0.00	N/A	N/A	370.513	3465.07	NT3 8-005	472.43	217.38
0.24	DK01+03/DK01+G	07-DK01-P004	1	STEEL 0.375	0.3750	0.00	N/A	N/A	372.636	3484.69	NT3 8-005	474.00	221.25
0.25	DK01+03/DK01+G	07-DK01-P005	1	STEEL 0.375	0.3750	0.00	N/A	N/A	134.167	1255.46	NT3 8-006	217.91	87.00
0.26	DK01+03/DK01+G	07-DK01-P008	1	STEEL 0.375	0.3750	0.00	N/A	N/A	22.490	211.50	NT3 8-007	63.22	
0.27	DK01+03/DK01+G	07-DK01-P012	1	STEEL 0.25	0.2500	0.00	N/A	N/A	24.547	346.65	NT1 4-051	88.78	36.51
0.28	DK01+03/DK01+G	07-DK01-P014	1	STEEL 0.375	0.3750	0.00	N/A	N/A	189.682	1772.62	NT3 8-005	308.62	126.02
0.29	DK01+03/DK01+G	07-DK01-P016	1	STEEL 0.25	0.2500	0.00	N/A	N/A	24.547	346.65	NT1 4-051	88.78	36.51
0.30	DK01+03/DK01+G	07-DK01-P017	1	STEEL 0.25	0.2500	0.00	N/A	N/A	24.571	346.65	NT1 4-051	88.78	36.51
0.31	DK01+03/DK01+G	07-DK01-P018	1	STEEL 0.3125	0.3125	0.00	N/A	N/A	4.842	54.64	NT5 16-005	34.52	
0.32	DK01+03/DK01+G	07-DK01-P020	1	STEEL 0.375	0.3750	0.00	N/A	N/A	189.682	1772.62	NT3 8-005	308.62	126.02
0.33	DK01+03/DK01+G	07-DK01-P022	1	STEEL 0.3125	0.3125	0.00	N/A	N/A	4.718	53.24	NT5 16-005	31.93	
0.34	DK01+03/DK01+G	07-DK01-P030	1	STEEL 0.375	0.3750	0.00	N/A	N/A	189.682	1772.62	NT3 8-005	308.62	126.02
0.35	DK01+03/DK01+G	07-DK01-P033	1	STEEL 0.375	0.3750	0.00	N/A	N/A	189.682	1772.62	NT3 8-005	308.62	126.02
0.36	DK01+03/DK01+G	07-DK01-P036	1	STEEL 0.375	0.3750	0.00	N/A	N/A	191.935	1793.80	NT3 8-005	297.10	126.02
0.37	DK01+03/DK01+G	07-DK01-P061	1	STEEL 0.375	0.3750	0.00	N/A	N/A	276.772	2587.63	NT3 8-005	372.30	171.00
0.38	DK03+S/DK03	07-DK03-P015	1	STEEL 0.25	0.2500		N/A	N/A	726.081	10242.19	NT1 4-048	549.11	
0.39	DK03+S/DK03	07-DK03-P021	1	STEEL 0.25	0.2500		N/A	N/A	939.897	13258.27	NT1 4-057	638.18	
0.40	DK03+S/DK03SP	07-DK03-P001	1	SP MARKING 0.25	0.2500		N/A	N/A	0.000	23520.80	NT_SP MARKING 1 4-017		
0.41	DK03+G/DK03+S	DK03	1	N/A			N/A	N/A	1665.978		N/A		
0.42	DK03+G/DK03+S	DK03SP	0	N/A			N/A	N/A	0.000		N/A		
0.43	DK03+G/DK03+S	07-DK03-S001	2	L3.0x2.0x.25	0.2500	131.20	E020	none	43.735		N/A		
0.44	DK03+G/DK03+S	07-DK03-S003	3	L3.0x2.0x.25	0.2500	128.14	none	none	42.766		N/A		
0.45	DK03+G/DK03+S	07-DK03-S005	1	L3.0x2.0x.25	0.2500	128.14	none	none	42.766		N/A		

ID No.	Assy Name	Part Name	Qty	Stock	Thickn ess (in)	Length (in)	EndCut Start	EndCut End	Part Weight (lbs)	Part Area (in^2) - One Side	Plate Nest Name	Part Nest Cut Length (in)	Part Flanged Length (in)
0.46	DK03+G/DK03+S	07-DK03-S006	1	L3.0x2.0x.25	0.2500	116.63	none	E079	38.863		N/A		
0.47	DK03+G/DK03+S	07-DK03-S053	5	FB3x1/4	0.2500	6.00	none	none	1.276		N/A		
0.48	DK01+03/DK03+G	DK03+S	1	N/A			N/A	N/A	1969.756		N/A		
0.49	DK01+03/DK03+G	07-DK03-P011	1	STEEL 0.375	0.3750		N/A	N/A	248.168	2321.98	NT3 8-005	324.71	147.9
0.50	DK01+03/DK03+G	07-DK03-P037	1	STEEL 0.375	0.3750		N/A	N/A	190.808	1783.21	NT3 8-005	302.86	126.0
0.51	DK01+03/DK03+G	07-DK03-P038	1	STEEL 0.375	0.3750		N/A	N/A	189.682	1772.62	NT3 8-005	308.62	126.0
0.52	BS01/DK01+03	DK01+G	1	N/A			N/A	N/A	10433.394		N/A		
0.53	BS01/DK01+03	DK03+G	1	N/A			N/A	N/A	2598.414		N/A		
0.54	DK02+S/DK02	07-DK02-P003	1	STEEL 0.25	0.2500		N/A	N/A	3736.289	52704.53	NT1 4-056	1,286.60	
0.55	DK02+S/DK02	07-DK02-P005	1	STEEL 0.25	0.2500		N/A	N/A	2921.174	41206.43	NT1 4-046	1,136.41	
0.56	DK02+S/DK02	07-DK02-P008	1	STEEL 0.25	0.2500		N/A	N/A	460.137	6490.75	NT1 4-048	480.97	
0.57	DK02+S/DK02SP	07-DK02-P024	1	SP MARKING 0.25			N/A	N/A	0	100554.07	NT SP MARKING 1 4-015		
0.58	DK02+G/DK02+S	DK02	1	N/A			N/A	N/A	7117.600		N/A		
0.59	DK02+G/DK02+S	DK02SP	0	N/A			N/A	N/A	0.000		N/A		
0.60	DK02+G/DK02+S	07-DK02-S001	1	L3.0x2.0x.25	0.2500	460.38	E079	none	153.880		N/A		
0.61	DK02+G/DK02+S	07-DK02-S002	1	L3.0x2.0x.25	0.2500	460.38	E079	none	153.880		N/A		
0.62	DK02+G/DK02+S	07-DK02-S003	2	L3.0x2.0x.25	0.2500	397.50	E079	none	132.843		N/A		
0.63	DK02+G/DK02+S	07-DK02-S004	1	L3.0x2.0x.25	0.2500	72.05	E079	E020	23.787		N/A		
0.64	DK02+G/DK02+S	07-DK02-S005	1	L3.0x2.0x.25	0.2500	374.38	E079	E002	124.856		N/A		
0.65	DK02+G/DK02+S	07-DK02-S006	1	L3.0x2.0x.25	0.2500	48.00	E079	E020	15.848		N/A		
0.66	DK02+G/DK02+S	07-DK02-S007	1	L3.0x2.0x.25	0.2500	48.00	E020	E079	15.848		N/A		
0.67	DK02+G/DK02+S	07-DK02-S008	1	L3.0x2.0x.25	0.2500	374.38	E079	E002	124.856		N/A		
0.68	DK02+G/DK02+S	07-DK02-S009	1	L3.0x2.0x.25	0.2500	37.38	E079	none	12.347		N/A		
0.69	DK02+G/DK02+S	07-DK02-S020	1	L3.0x2.0x.25	0.2500	460.38	E079	none	153.880		N/A		
0.70	DK02+G/DK02+S	07-DK02-S032	1	L3.0x2.0x.25	0.2500	397.38	E079	none	132.801		N/A		
0.71	DK02+G/DK02+S	07-DK02-S050	2	L3.0x2.0x.25	0.2500	46.00	none	none	15.391		N/A		
0.72	DK02+G/DK02+S	07-DK02-S054	1	FB4x1/4	0.2500	71.75	E020	E020	20.234		N/A		
0.73	DK02+G/DK02+S	07-DK02-S055	1	FB4x1/4	0.2500	71.50	E020	E020	20.164		N/A		
0.74	DK02+G/DK02+S	07-DK02-S056	1	FB4x1/4	0.2500	63.00	E020	E020	17.753		N/A		
0.75	DK02+G/DK02+S	07-DK02-S061	1	L3.0x2.0x.25	0.2500	14.38	E079	E079	4.493		N/A		
0.76	DK02+G/DK02+S	07-DK02-S062	1	L3.0x2.0x.25	0.2500	14.38	E079	E079	4.493		N/A		
0.77	DK02+04/DK02+G	DK02+S	1	N/A			N/A	N/A	8393.189		N/A		
0.78	DK02+04/DK02+G	07-DK02-F004	1	FB4x1/4	0.2500	76.88	none	none	21.789		N/A		
0.79	DK02+04/DK02+G	07-DK02-P009	1	STEEL 0.3125	0.3125		N/A	N/A	4.718	53.24	NT5 16-005	31.93	
0.80	DK02+04/DK02+G	07-DK02-P010	1	STEEL 0.375	0.3750		N/A	N/A	370.513	3465.07	NT3 8-005	472.43	217.4
0.81	DK02+04/DK02+G	07-DK02-P011	1	STEEL 0.375	0.3750		N/A	N/A	372.636	3484.69	NT3 8-005	474.00	221.3
0.82	DK02+04/DK02+G	07-DK02-P014	1	STEEL 0.25	0.2500		N/A	N/A	24.571	346.65	NT1 4-051	88.78	36.5
0.83	DK02+04/DK02+G	07-DK02-P015	1	STEEL 0.375	0.3750		N/A	N/A	276.772	2587.63	NT3 8-005	372.30	171.0
0.84	DK02+04/DK02+G	07-DK02-P016	1	STEEL 0.25	0.2500		N/A	N/A	24.571	346.65	NT1 4-051	88.78	36.5
0.85	DK02+04/DK02+G	07-DK02-P017	1	STEEL 0.25	0.2500		N/A	N/A	24.547	346.65	NT1 4-051	88.78	36.5
0.86	DK02+04/DK02+G	07-DK02-P021	1	STEEL 0.375	0.3750		N/A	N/A	189.682	1772.62	NT3 8-005	308.62	126.0
0.87	DK02+04/DK02+G	07-DK02-P026	1	STEEL 0.375	0.3750		N/A	N/A	134.374	1257.25	NT3 8-006	218.52	87.0
0.88	DK02+04/DK02+G	07-DK02-P027	1	STEEL 0.375	0.3750		N/A	N/A	189.682	1772.62	NT3 8-005	308.62	126.0
0.89	DK02+04/DK02+G	07-DK02-P029	1	STEEL 0.375	0.3750		N/A	N/A	189.682	1772.62	NT3 8-005	308.62	126.0
0.90	DK02+04/DK02+G	07-DK02-P032	1	STEEL 0.375	0.3750		N/A	N/A	189.682	1772.62	NT3 8-006	308.62	126.0

ID No.	Assy Name	Part Name	Qty	Stock	Thickn ess (in)	Length (in)	EndCut Start	EndCut End	Part Weight (lbs)	Part Area (in^2) - One Side	Plate Nest Name	Part Nest Cut Length (in)	Part Flanged Length (in)
0.91	DK02+04/DK02+G	07-DK02-P042	1	STEEL 0.375	0.3750		N/A	N/A	191.935	1793.80	NT3 8-005	297.10	126.0
0.92	DK02+04/DK02+G	07-DK02-P062	1	STEEL 0.3125	0.3125		N/A	N/A	4.842	54.64	NT5 16-005	34.52	
0.93	DK02+04/DK02+G	07-LB02-P002	1	STEEL 0.375	0.3750		N/A	N/A	22.490	211.50	NT3 8-007	63.22	
0.94	DK04+S/DK04	07-DK04-P010	1	STEEL 0.25	0.2500		N/A	N/A	737.586	10404.48	NT1 4-048	556.75	
0.95	DK04+S/DK04	07-DK04-P011	1	STEEL 0.25	0.2500		N/A	N/A	946.120	13346.08	NT1 4-057	633.91	
0.96	DK04+S/DK04SP	07-DK04-P012	1	SP MARKING 0.25			N/A	N/A	0.000	23770.83	NT SP MARKING 1 4-018		
0.97	DK04+G/DK04+S	DK04	1	N/A			N/A	N/A	1683.706		N/A		
0.98	DK04+G/DK04+S	DK04SP	1	N/A			N/A	N/A	0.000		N/A		
0.99	DK04+G/DK04+S	07-DK04-S001	2	L3.0x2.0x.25	0.2500	128.16	none	none	42.776		N/A		
1.00	DK04+G/DK04+S	07-DK04-S002	1	L3.0x2.0x.25	0.2500	23.89	E002	E020	7.686		N/A		
1.01	DK04+G/DK04+S	07-DK04-S005	2	FB3x1/4	0.2500	6.00	none	none	1.276		N/A		
1.02	DK04+G/DK04+S	07-DK04-S006	1	L3.0x2.0x.25	0.2500	120.75	E079	E020	40.186		N/A		
1.03	DK04+G/DK04+S	07-DK04-S010	1	L3.0x2.0x.25	0.2500	107.13	none	E020	35.683		N/A		
1.04	DK04+G/DK04+S	07-DK04-S013	4	L3.0x2.0x.25	0.2500	131.24	none	E020	43.746		N/A		
1.05	DK04+G/DK04+S	07-DK04-S065	1	L3.0x2.0x.25	0.2500	47.69	none	E002	15.607		N/A		
1.06	DK02+04/DK04+G	DK04+S	1	N/A			N/A	N/A	2045.957		N/A		
1.07	DK02+04/DK04+G	07-DK04-P002	1	STEEL 0.375	0.3750		N/A	N/A	250.973	2346.95	NT3 8-005	329.11	149.1
1.08	DK02+04/DK04+G	07-DK04-P043	1	STEEL 0.375	0.3750		N/A	N/A	190.808	1783.21	NT3 8-007	302.86	126.0
1.09	DK02+04/DK04+G	07-DK04-P044	1	STEEL 0.375	0.3750		N/A	N/A	189.682	1772.62	NT3 8-005	308.62	126.0
1.10	DK02+04/DK04+G	07-DK04-P046	1	STEEL 0.375	0.3750		N/A	N/A	123.992	1160.22	NT3 8-006	204.54	80.3
1.11	BS01/DK02+04	DK02+G	1	N/A			N/A	N/A	10625.675		N/A		
1.12	BS01/DK02+04	DK04+G	1	N/A			N/A	N/A	2801.413		N/A		
1.13	BS02/BS01	DK01+03	1	N/A			N/A	N/A	13031.808		N/A		
1.14	BS02/BS01	DK02+04	1	N/A			N/A	N/A	13427.088		N/A		
1.15	BS02/BS01	07-DK01-P001	1	STEEL 0.375	0.3750		N/A	N/A	255.170	2387.19	NT3 8-006	351.01	142.0
1.16	BS02/BS01	07-DK01-P013	4	STEEL 0.3125	0.3125		N/A	N/A	4.752	53.63	NT5 16-005	34.02	
1.17	BS02/BS01	07-DK01-P025	5	STEEL 0.375	0.3750		N/A	N/A	254.045	2376.61	NT3 8-006	356.75	142.0
1.18	BS02/BS01	07-DK01-P028	4	STEEL 0.3125	0.3125		N/A	N/A	5.331	60.16	NT5 16-005	34.52	
1.19	BS02/BS01	07-DK02-P013	4	STEEL 0.3125	0.3125		N/A	N/A	4.752	53.63	NT5 16-005	34.02	
1.20	BS02/BS01	07-DK02-P028	4	STEEL 0.3125	0.3125		N/A	N/A	5.331	60.16	NT5 16-005	34.52	
1.21	BS02/BS01	07-DK03-P002	1	STEEL 0.375	0.3750		N/A	N/A	254.045	2376.61	NT3 8-005	356.75	142.0
1.22	BS02/BS01	07-DK03-P004	1	STEEL 0.375	0.3750		N/A	N/A	254.045	2376.61	NT3 8-006	356.75	142.0
1.23	BS02/BS01	07-DK03-P006	1	STEEL 0.3125	0.3125		N/A	N/A	5.290	59.70	NT5 16-005	34.32	
1.24	BS02/BS01	07-DK03-P007	1	STEEL 0.3125	0.3125		N/A	N/A	4.717	53.23	NT5 16-005	33.82	
1.25	BS02/BS01	07-DK03-P013	2	STEEL 0.3125	0.3125		N/A	N/A	4.752	53.63	NT5 16-005	34.02	
1.26	BS02/BS01	07-DK03-P026	1	STEEL 0.3125	0.3125		N/A	N/A	5.290	59.70	NT5 16-005	34.32	
1.27	BS02/BS01	07-DK03-P027	1	STEEL 0.3125	0.3125		N/A	N/A	4.717	53.23	NT5 16-005	33.82	
1.28	BS02/BS01	07-DK03-P028	2	STEEL 0.3125	0.3125		N/A	N/A	5.331	60.16	NT5 16-005	34.52	
1.29	BS02/BS01	07-DK03-P045	1	STEEL 0.375	0.3750		N/A	N/A	251.230	2351.31	NT3 8-005	351.01	143.5
1.30	LB01+03/LB01	07-LB01-P002	1	STEEL 0.375	0.3750		N/A	N/A	130.157	1221.20	NT3 8-006	149.34	46.2
1.31	LB01+03/LB01	07-LB01-P003	1	STEEL 0.25	0.2500		N/A	N/A	3115.745	43951.07	NT1 4-050	1,674.91	
1.32	LB01+03/LB01	07-LB01-P004	1	STEEL 0.375	0.3750		N/A	N/A	211.771	1984.14	NT3 8-006	249.85	97.7
1.33	LB01+03/LB01	07-LB01-P005	1	STEEL 0.25	0.2500		N/A	N/A	97.557	1376.16	NT1 4-051	228.98	
1.34	LB01+03/LB01	07-LB01-P006	1	STEEL 0.375	0.3750		N/A	N/A	211.771	1984.14	NT3 8-006	249.85	97.7
1.35	LB01+03/LB01	07-LB01-P007	1	STEEL 0.375	0.3750		N/A	N/A	211.771	1984.14	NT3 8-006	249.85	97.7

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1.36	LB01+03/LB01	07-LB01-P008	1	STEEL 0.375	0.3750		N/A	N/A	211.771	1984.14	NT3 8-006	249.85	97.7
1.37	LB01+03/LB01	07-LB01-P010	1	STEEL 0.375	0.3750		N/A	N/A	211.771	1984.14	NT3 8-006	249.85	97.7
1.38	LB01+03/LB01	07-LB01-S001	2	L3.0x2.0x.1875	0.1875	8.75	E079	E020	2.057		N/A		
1.39	LB01+03/LB01	07-LB01-S003	1	L3.0x2.0x.1875	0.1875	415.63	E079	none	105.335		N/A		
1.40	LB01+03/LB01	07-LB01-S004	1	L3.0x2.0x.1875	0.1875	46.00	none	none	11.672		N/A		
1.41	LB01+03/LB01	07-LB01-S006	1	L3.0x2.0x.1875	0.1875	343.88	none	E079	87.129		N/A		
1.42	LB01+03/LB01	07-LB01-S007	1	L3.0x2.0x.1875	0.1875	8.75	E020	E079	2.057		N/A		
1.43	LB01+03/LB01	07-LB01-S009	1	L3.0x2.0x.1875	0.1875	343.88	none	E079	87.129		N/A		
1.44	LB01+03/LB01	07-LB01-S010	3	L3.0x2.0x.1875	0.1875	27.00	E020	E020	6.772		N/A		
1.45	LB01+03/LB01	07-LB01-S011	1	L9.0x4.0x.500	0.5000	101.01	none	none	177.362		N/A		
1.46	LB01+03/LB01	BKT092	3	STEEL 0.25	0.2500		N/A	N/A	4.014	56.62	NT1 4-046	29.15	
1.47	LB01+03/LB03	07-LB03-P005	1	STEEL 0.375	0.3750		N/A	N/A	215.871	2021.40	NT3 8-006	234.35	97.7
1.48	LB01+03/LB03	07-LB03-P009	1	STEEL 0.25	0.2500		N/A	N/A	418.769	5907.20	NT1 4-053	695.88	
1.49	LB01+03/LB03	07-LB03-S008	1	L6.0x3.5x.3125	0.3125	71.75	E014	E014	57.016		N/A		
1.50	LB01+03/LB03	07-LB03-S018	1	L3.0x2.0x.1875	0.1875	39.63	none	E079	9.852		N/A		
1.51	LB01+03/LB03	07-LB03-S019	2	L3.0x2.0x.1875	0.1875	39.63	E079	none	9.852		N/A		
1.52	LB01+03S/LB01+03	LB01	1	N/A			N/A	N/A	4909.288		N/A		
1.53	LB01+03S/LB01+03	LB03	1	N/A			N/A	N/A	721.210		N/A		
1.54	VT01/LB05	07-LB05-P001	1	STEEL 0.3125	0.3125		N/A	N/A	175.423	1979.63	NT5 16-005	176.16	
1.55	VT01/LB05	07-LB05-P002	1	STEEL 0.25	0.2500		N/A	N/A	356.416	5027.65	NT1 4-049	302.14	
1.56	VT01/LB05	07-LB05-S001	1	FB3x5/16	0.3125	45.75	none	none	12.162		N/A		
1.57	VT01/LB05	07-LB05-S002	1	L3.0x2.0x.25	0.2500	55.21	none	E020	18.405		N/A		
1.58	VT01/TB41S	07-TB41S-P001	1	STEEL 0.25	0.2500		N/A	N/A	297.616	4198.21	NT1 4-049	285.34	
1.59	VT01/TB41S	07-TB41S-S001	1	L3.0x2.0x.25	0.2500	54.09	none	E020	18.043		N/A		
1.60	VT01/TB41S	07-TB41S-S002	1	L3.0x2.0x.25	0.2500	53.76	none	E020	17.935		N/A		
1.61	VT01/TB41S	07-TB41S-S003	1	FB3x5/16	0.3125	39.50	none	none	10.501		N/A		
1.62	VT01/TB39S	07-TB39S-P001	1	STEEL 0.25	0.2500		N/A	N/A	297.616	4198.21	NT1 4-049	285.34	
1.63	VT01/TB39S	07-TB39S-S002	1	L3.0x2.0x.25	0.2500	54.09	E020	none	18.043		N/A		
1.64	VT01/TB39S	07-TB39S-S003	1	L3.0x2.0x.25	0.2500	53.76	E020	none	17.935		N/A		
1.65	VT01/TB39S	07-TB39S-S004	1	FB3x5/16	0.3125	39.50	none	none	10.501		N/A		
1.66	LB01+03S/VT01	LB05	1	N/A			N/A	N/A	562.406		N/A		
1.67	LB01+03S/VT01	TB39S	1	N/A			N/A	N/A	344.095		N/A		
1.68	LB01+03S/VT01	TB41S	1	N/A			N/A	N/A	344.095		N/A		
1.69	LB01+03S/DP01	07-DP01-P001	1	STEEL 0.25	0.2500		N/A	N/A	101.587	1433.00	NT1 4-049	155.75	
1.70	LB01+03S/DP01	07-DP01-P002	1	STEEL 0.25	0.2500		N/A	N/A	187.543	2645.50	NT1 4-049	217.00	
1.71	LB01+03S/DP01	07-DP01-P003	1	STEEL 0.25	0.2500		N/A	N/A	144.004	2031.33	NT1 4-048	199.82	
1.72	LB01+03S/DP01	07-DP01-P004	1	STEEL 0.25	0.2500		N/A	N/A	143.191	2019.88	NT1 4-048	199.50	
1.73	BS02/LB01+03S	DP01	1	N/A			N/A	N/A	576.325		N/A		
1.74	BS02/LB01+03S	LB01+03	1	N/A			N/A	N/A	5630.498		N/A		
1.75	BS02/LB01+03S	VT01	1	N/A			N/A	N/A	1248.795		N/A		
1.76	LB02+04/LB02	07-LB02-P001	1	STEEL 0.375	0.3750		N/A	N/A	130.157	1221.20	NT3 8-007	149.34	46.2
1.77	LB02+04/LB02	07-LB02-P007	1	STEEL 0.25	0.2500		N/A	N/A	97.557	1376.16	NT1 4-051	228.98	
1.78	LB02+04/LB02	07-LB02-P009	5	STEEL 0.375	0.3750		N/A	N/A	211.771	1984.14	NT3 8-006	249.85	97.7
1.79	LB02+04/LB02	07-LB02-P011	1	STEEL 0.25	0.2500		N/A	N/A	3115.745	43951.07	NT1 4-052	1,674.91	
1.80	LB02+04/LB02	07-LB02-S001	1	L3.0x2.0x.1875	0.1875	8.75	E020	E079	2.057		N/A		

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1.81	LB02+04/LB02	07-LB02-S002	1	L3.0x2.0x.1875	0.1875	8.75	E079	E020	2.057		N/A		
1.82	LB02+04/LB02	07-LB02-S004	1	L3.0x2.0x.1875	0.1875	46.00	none	none	11.672		N/A		
1.83	LB02+04/LB02	07-LB02-S005	1	L3.0x2.0x.1875	0.1875	343.88	E079	none	87.129		N/A		
1.84	LB02+04/LB02	07-LB02-S006	1	L3.0x2.0x.1875	0.1875	343.88	E079	none	87.129		N/A		
1.85	LB02+04/LB02	07-LB02-S007	1	L3.0x2.0x.1875	0.1875	415.63	none	E079	105.335		N/A		
1.86	LB02+04/LB02	07-LB02-S008	1	L3.0x2.0x.1875	0.1875	8.75	E020	E079	2.057		N/A		
1.87	LB02+04/LB02	07-LB02-S009	1	L9.0x4.0x.500	0.5000	101.01	none	none	177.362		N/A		
1.88	LB02+04/LB02	07-LB02-S010	3	L3.0x2.0x.1875	0.1875	27.00	E020	E020	6.772		N/A		
1.89	LB02+04/LB02	BKT092	3	STEEL 0.25	0.2500		N/A	N/A	4.014	56.62	NT1 4-046	29.15	
1.90	LB02+04/LB04	07-LB04-P001	1	STEEL 0.375	0.3750		N/A	N/A	215.871	2021.40	NT3 8-006	234.35	97.7
1.91	LB02+04/LB04	07-LB04-P002	1	STEEL 0.25	0.2500		N/A	N/A	418.769	5907.20	NT1 4-053	695.88	
1.92	LB02+04/LB04	07-LB04-S004	2	L3.0x2.0x.1875	0.1875	39.63	none	E079	9.852		N/A		
1.93	LB02+04/LB04	07-LB04-S008	1	L6.0x3.5x.3125	0.3125	71.75	E014	E014	57.016		N/A		
1.94	LB02+04/LB04	07-LB04-S012	1	L3.0x2.0x.1875	0.1875	39.63	E079	none	9.852		N/A		
1.95	LB02+04P/LB02+04	LB02	1	N/A			N/A	N/A	4909.470		N/A		
1.96	LB02+04P/LB02+04	LB04	1	N/A			N/A	N/A	721.210		N/A		
1.97	VT02/LB06	07-LB06-P001	1	STEEL 0.25	0.2500		N/A	N/A	356.416	5027.65	NT1 4-053	302.14	
1.98	VT02/LB06	07-LB06-P002	1	STEEL 0.3125	0.3125		N/A	N/A	175.423	1979.63	NT5 16-005	176.16	
1.99	VT02/LB06	07-LB06-S001	1	FB3x5/16	0.3125	45.75	none	none	12.162		N/A		
2.00	VT02/LB06	07-LB06-S002	1	L3.0x2.0x.25	0.2500	55.21	E020	none	18.405		N/A		
2.01	VT02/TB41P	07-TB41P-P001	1	STEEL 0.25	0.2500		N/A	N/A	297.616	4198.21	NT1 4-049	285.34	
2.02	VT02/TB41P	07-TB41P-S001	1	FB3x5/16	0.3125	39.50	none	none	10.501		N/A		
2.03	VT02/TB41P	07-TB41P-S002	1	L3.0x2.0x.25	0.2500	53.76	E020	none	17.935		N/A		
2.04	VT02/TB41P	07-TB41P-S003	1	L3.0x2.0x.25	0.2500	54.09	E020	none	18.043		N/A		
2.05	VT02/TB39P	07-TB39P-P001	1	STEEL 0.25	0.2500		N/A	N/A	297.616	4198.21	NT1 4-049	285.34	
2.06	VT02/TB39P	07-TB39P-S001	1	FB3x5/16	0.3125	39.50	none	none	10.501		N/A		
2.07	VT02/TB39P	07-TB39P-S002	1	L3.0x2.0x.25	0.2500	53.76	none	E020	17.935		N/A		
2.08	VT02/TB39P	07-TB39P-S003	1	L3.0x2.0x.25	0.2500	54.09	none	E020	18.043		N/A		
2.09	LB02+04P/VT02	LB06	1	N/A			N/A	N/A	562.406		N/A		
2.10	LB02+04P/VT02	TB39P	1	N/A			N/A	N/A	344.095		N/A		
2.11	LB02+04P/VT02	TB41P	1	N/A			N/A	N/A	344.095		N/A		
2.12	LB02+04P/DP02	07-DP02-P001	1	STEEL 0.25	0.2500		N/A	N/A	101.587	1433.00	NT1 4-049	155.75	
2.13	LB02+04P/DP02	07-DP02-P002	1	STEEL 0.25	0.2500		N/A	N/A	187.543	2645.50	NT1 4-049	217.00	
2.14	LB02+04P/DP02	07-DP02-P003	1	STEEL 0.25	0.2500		N/A	N/A	144.004	2031.33	NT1 4-048	199.82	
2.15	LB02+04P/DP02	07-DP02-P004	1	STEEL 0.25	0.2500		N/A	N/A	143.191	2019.88	NT1 4-049	199.50	
2.16	BS02/LB02+04P	DP02	1	N/A			N/A	N/A	576.325		N/A		
2.17	BS02/LB02+04P	LB02+04	1	N/A			N/A	N/A	5630.680		N/A		
2.18	BS02/LB02+04P	VT02	1	N/A			N/A	N/A	1248.795		N/A		
2.19	BS02/TB63S	07-TB63S-P001	1	STEEL 0.25	0.2500		N/A	N/A	943.024	13302.40	NT1 4-053	466.18	
2.20	BS02/TB63S	07-TB63S-S001	1	FB3x5/16	0.3125	45.75	none	none	12.162		N/A		
2.21	BS02/TB63S	07-TB63S-S002	1	L3.0x2.0x.25	0.2500	54.51	E020	none	18.186		N/A		
2.22	BS02/TB63S	07-TB63S-S003	1	L3.0x2.0x.25	0.2500	54.84	E020	none	18.294		N/A		
2.23	BS02/TB63S	07-TB63S-S004	2	L3.0x2.0x.25	0.2500	48.00	none	none	16.061		N/A		
2.24	BS02/TB63S	07-TB63S-S005	1	L3.0x2.0x.25	0.2500	45.87	none	none	15.347		N/A		
2.25	BS02/TB63S	07-TB63S-S006	1	L3.0x2.0x.25	0.2500	46.34	none	none	15.504		N/A		

ID No.	Assy Name	Part Name	Qty	Stock	Thickn ess (in)	Length (in)	EndCut Start	EndCut End	Part Weight (lbs)	Part Area (in^2) - One Side	Plate Nest Name	Part Nest Cut Length (in)	Part Flanged Length (in)
2.26	BS02/TB63S	07-TB63S-S007	1	L3.0x2.0x.25	0.2500	48.00	none	none	16.061		N/A		
2.27	BS02/TB63S	07-TB63S-S008	1	L3.0x2.0x.25	0.2500	46.81	none	none	15.662		N/A		
2.28	BS02/TB63P	07-TB63P-P001	1	STEEL 0.25	0.2500		N/A	N/A	348.053	4909.67	NT1 4-053	299.47	
2.29	BS02/TB63P	07-TB63P-S001	1	FB3x5/16	0.3125	45.75	none	none	12.162		N/A		
2.30	BS02/TB63P	07-TB63P-S002	1	L3.0x2.0x.25	0.2500	54.84	none	E020	18.294		N/A		
2.31	BS02/TB63P	07-TB63P-S003	1	L3.0x2.0x.25	0.2500	54.51	none	E020	18.186		N/A		
2.32	BS03/BS02	BS01	1	N/A			N/A	N/A	28864.453		N/A		
2.33	BS03/BS02	LB01+03S	1	N/A			N/A	N/A	7455.618		N/A		
2.34	BS03/BS02	LB02+04P	1	N/A			N/A	N/A	7455.800		N/A		
2.35	BS03/BS02	TB63P	1	N/A			N/A	N/A	396.694		N/A		
2.36	BS03/BS02	TB63S	1	N/A			N/A	N/A	1086.360		N/A		
2.37	BS03/BS02	07-DK03-P031	1	STEEL 0.3125	0.3125		N/A	N/A	19.445	219.43	NT5 16-005	68.33	
2.38	BS03/SN01	07-SN01-S025	16	ST4X4X0.25	0.2500	90.03	none	none	88.886		N/A		
2.39	BS03/SN01	BKT096	32	STEEL_0.375	0.3750		N/A	N/A	3.805	35.79	NT3 8-007	23.15	
2.40	BS04/BS03	BS02	1	N/A			N/A	N/A	45278.371		N/A		
2.41	BS04/BS03	SN01	1	N/A			N/A	N/A	1543.944		N/A		
2.42	BS04/BS03	07-DK01-F002	1	FB6x1/4	0.2500	97.00	none	none	41.259		N/A		
2.43	BS04/BS03	07-DK01-F003	1	FB6x1/4	0.2500	204.50	none	none	86.984		N/A		
2.44	BS04/BS03	07-DK01-P007	1	STEEL 0.25	0.2500		N/A	N/A	13.826	195.04	NT1 4-051	102.70	
2.45	BS04/BS03	07-DK01-P010	1	STEEL 0.25	0.2500		N/A	N/A	35.245	498.46	NT1 4-051	104.92	40.6
2.46	BS04/BS03	07-DK01-S063	1	FB2x1/4	0.2500	173.73	none	none	24.631		N/A		
2.47	BS04/BS03	07-DK02-F002	1	FB6x1/4	0.2500	97.00	none	none	41.259		N/A		
2.48	BS04/BS03	07-DK02-F003	1	FB6x1/4	0.2500	204.50	none	none	86.984		N/A		
2.49	BS04/BS03	07-DK02-P001	1	STEEL 0.25	0.2500		N/A	N/A	13.826	195.04	NT1 4-051	102.70	
2.50	BS04/BS03	07-DK02-P019	1	STEEL 0.25	0.2500		N/A	N/A	35.245	498.46	NT1 4-051	104.92	40.6
2.51	BS04/BS03	07-DK02-S046	1	FB2x1/4	0.2500	173.73	none	none	24.631		N/A		
2.52	BS04/BS03	07-DK03-F002	1	FB6x1/4	0.2500	281.74	none	none	119.839		N/A		
2.53	BS04/BS03	07-DK04-F001	1	FB6x1/4	0.2500	281.74	none	none	119.839		N/A		
2.54	BS04/BS03	07-LB01-S012	1	FB2x1/4	0.2500	101.49	none	none	14.389		N/A		
2.55	BS04/BS03	07-LB02-S023	1	FB2x1/4	0.2500	101.49	none	none	14.389		N/A		
2.56	BS04/BS03	BKT095	10	STEEL 0.3125	0.3125		N/A	N/A	1.191	13.44	NT5 16-005	18.02	
2.57	BS04/ST01S	07-ST01S-P001	1	STEEL 0.25	0.2500		N/A	N/A	76.068	1073.02	NT1 4-049	283.78	
2.58	BS04/ST01S	07-ST01S-P002	10	STEEL 0.25 DIAMOND	0.2500		N/A	N/A	22.380	315.00	NT1 4 DIAMOND-003	81.00	30.0
2.59	BS04/ST01S	07-ST01S-S027	1	C8x13.75#	0.3125	139.46	STAIR	STAIR	151.937		N/A		
2.60	BS04/ST01P	07-ST01P-P001	1	STEEL 0.25	0.2500		N/A	N/A	76.068	1073.02	NT1 4-049	283.78	
2.61	BS04/ST01P	07-ST01P-P002	10	STEEL 0.25 DIAMOND	0.2500		N/A	N/A	22.380	315.00	NT1 4 DIAMOND-003	81.00	30.0
2.62	BS04/ST01P	07-ST01P-S029	1	C8x13.75#	0.3125	139.46	STAIR	STAIR	151.937		N/A		
2.63	BS04/ST02	07-ST02-P001	1	STEEL 0.25	0.2500		N/A	N/A	105.442	1487.38	NT1 4-049	155.50	
2.64	BS04/ST02	07-ST02-P002	1	STEEL 0.25	0.2500		N/A	N/A	62.845	886.50	NT1 4-049	151.50	
2.65	BS04/ST02	07-ST02-P003	1	STEEL 0.25	0.2500		N/A	N/A	62.845	886.50	NT1 4-049	151.50	
2.66	BS04/ST02	07-ST02-P004	1	STEEL 0.25	0.2500		N/A	N/A	7.709	108.75	NT1 4-046	92.00	
2.67	BS04/ST02	07-ST02-P005	1	STEEL 0.25 DIAMOND	0.2500		N/A	N/A	37.776	532.88	NT1 4 DIAMOND-003	111.50	
2.68	BS04/ST02	07-ST02-P006	1	STEEL 0.25	0.2500		N/A	N/A	23.899	337.13	NT1 4-046	102.50	
2.69	BS04/ST02	07-ST02-P007	1	STEEL 0.25 DIAMOND	0.2500		N/A	N/A	37.776	532.88	NT1 4 DIAMOND-003	111.50	
2.70	BS04/ST02	07-ST02-P008	1	STEEL 0.25	0.2500		N/A	N/A	23.242	327.85	NT1 4-046	102.52	

ID No.	Assy Name	Part Name	Qty	Stock	Thickn ess (in)	Length (in)	EndCut Start	EndCut End	Part Weight (lbs)	Part Area (in^2) - One Side	Plate Nest Name	Part Nest Cut Length (in)	Part Flanged Length (in)
2.71	BS04/ST02	07-ST02-S025	1	FB2x3/8	0.3750	18.00	none	none	3.828		N/A		
2.72	BS04/ST02	07-ST02-S026	1	FB2x3/8	0.3750	18.00	none	none	3.828		N/A		
2.73	BS04/ST02	07-ST02-S028	1	FB2x3/8	0.3750	43.38	none	none	9.225		N/A		
2.74	BS04/ST03S	07-ST03S-P007	2	STEEL_0.25 DIAMOND	0.2500		N/A	N/A	28.721	404.25	NT1_4 DIAMOND-003	98.00	38.5
2.75	BS04/ST03S	07-ST03S-P018	1	STEEL_0.25	0.2500		N/A	N/A	35.012	493.89	NT1_4-049	94.07	
2.76	BS04/ST03S	07-ST03S-P020	1	STEEL_0.25	0.2500		N/A	N/A	33.711	475.53	NT1_4-049	93.20	
2.77	BS04/ST03P	07-ST03P-P019	1	STEEL_0.25	0.2500		N/A	N/A	33.711	475.53	NT1_4-049	93.20	
2.78	BS04/ST03P	07-ST03P-P021	2	STEEL_0.25 DIAMOND	0.2500		N/A	N/A	28.721	404.25	NT1_4 DIAMOND-003	98.00	38.5
2.79	BS04/ST03P	07-ST03P-P022	1	STEEL_0.25	0.2500		N/A	N/A	35.012	493.89	NT1_4-049	94.07	
2.80	GE/BS04	BS03	1	N/A			N/A	N/A	47510.350		N/A		
2.81	GE/BS04	ST01P	1	N/A			N/A	N/A	451.805		N/A		
2.82	GE/BS04	ST01S	1	N/A			N/A	N/A	451.805		N/A		
2.83	GE/BS04	ST02	1	N/A			N/A	N/A	378.416		N/A		
2.84	GE/BS04	ST03P	1	N/A			N/A	N/A	126.165		N/A		
2.85	GE/BS04	ST03S	1	N/A			N/A	N/A	126.165		N/A		
2.86	GE/BS04	07-DK01-P015	1	STEEL_0.25	0.2500		N/A	N/A	21.158	298.45	NT1_4-057	129.38	
2.87	GE/BS04	07-DK01-P019	1	STEEL_0.25	0.2500		N/A	N/A	21.158	298.45	NT1_4-057	129.38	
2.88	GE/BS04	07-DK02-P004	1	STEEL_0.25	0.2500		N/A	N/A	21.158	298.45	NT1_4-057	129.38	
2.89	GE/BS04	07-DK02-P007	1	STEEL_0.25	0.2500		N/A	N/A	21.158	298.45	NT1_4-057	129.38	

ID No.	Assy Name	Part Name	Part Bevel Length (in)	Part Weld Length (in)	Part Nest Mark Length (in)	Is Flanged	Weld_Type_Side_1	Weld_Type_Side_2
0.01	DK01+S/DK01	07-DK01-P002		431	1,292.75	False	B L 1 G F 0.25	0
0.02	DK01+S/DK01	07-DK01-P009		210.25	480.97	False	B L 1 G F 0.25	0
0.03	DK01+S/DK01	07-DK01-P023		0	1,129.85	False	0	0
0.04	DK01+S/DK01SP	07-DK01-P039		0	1,682.68	False	0	0
0.05	DK01+G/DK01+S	DK01		0			0	0
0.06	DK01+G/DK01+S	DK01SP		0			0	0
0.07	DK01+G/DK01+S	07-DK01-S001		397.5			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
0.08	DK01+G/DK01+S	07-DK01-S002		460.375			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
0.09	DK01+G/DK01+S	07-DK01-S003		48			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
0.10	DK01+G/DK01+S	07-DK01-S004		48			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
0.11	DK01+G/DK01+S	07-DK01-S007		374.375			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
0.12	DK01+G/DK01+S	07-DK01-S008		72.053			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
0.13	DK01+G/DK01+S	07-DK01-S009		37.375			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
0.14	DK01+G/DK01+S	07-DK01-S016		374.375			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
0.15	DK01+G/DK01+S	07-DK01-S036		14.375			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
0.16	DK01+G/DK01+S	07-DK01-S050		46			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
0.17	DK01+G/DK01+S	07-DK01-S051		14.375			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
0.18	DK01+G/DK01+S	07-DK01-S054		71.75			T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875x2.5x10+4
0.19	DK01+G/DK01+S	07-DK01-S055		71.5			T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875x2.5x10+4
0.20	DK01+G/DK01+S	07-DK01-S056		63			T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875x2.5x10+4
0.21	DK01+03/DK01+G	DK01+S		0			0	0
0.22	DK01+03/DK01+G	07-DK01-F001		74.877			T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875
0.23	DK01+03/DK01+G	07-DK01-P003		219.5	472.43	True	T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875x2.5x10+4
0.24	DK01+03/DK01+G	07-DK01-P004		221.25	474.00	True	T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875x2.5x10+4
0.25	DK01+03/DK01+G	07-DK01-P005		84.0167	217.91	True	T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875x2.5x10+4
0.26	DK01+03/DK01+G	07-DK01-P008		15.5	63.22	False	L FLT na F H 0.25	L FLT na F H 0.25
0.27	DK01+03/DK01+G	07-DK01-P012		33.5071	88.78	True	L FLT na F H 0.1875	L FLT na F H 0.1875
0.28	DK01+03/DK01+G	07-DK01-P014		123.043	308.62	True	T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875x2.5x10+4
0.29	DK01+03/DK01+G	07-DK01-P016		33.5069	88.78	True	T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875x2.5x10+4
0.30	DK01+03/DK01+G	07-DK01-P017		33.5069	88.78	True	T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875x2.5x10+4
0.31	DK01+03/DK01+G	07-DK01-P018		16.9746	34.52	False	T FLT na F V 0.25	T FLT na F V 0.25
0.32	DK01+03/DK01+G	07-DK01-P020		124.5814	308.62	True	T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875x2.5x10+4
0.33	DK01+03/DK01+G	07-DK01-P022		16.3556	31.93	False	T FLT na F V 0.1875	T FLT na F V 0.1875
0.34	DK01+03/DK01+G	07-DK01-P030		123.043	308.62	True	T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875x2.5x10+4
0.35	DK01+03/DK01+G	07-DK01-P033		123.043	308.62	True	T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875x2.5x10+4
0.36	DK01+03/DK01+G	07-DK01-P036		123.043	297.10	True	T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875x2.5x10+4
0.37	DK01+03/DK01+G	07-DK01-P061		171.0329	372.30	True	T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875x2.5x10+4
0.38	DK03+S/DK03	07-DK03-P015		81.4672	549.11	False	B L 1 G F 0.25	0
0.39	DK03+S/DK03	07-DK03-P021		0	638.18	False	0	0
0.40	DK03+S/DK03SP	07-DK03-P001		0	1,025.57	False	0	0
0.41	DK03+G/DK03+S	DK03		0			0	0
0.42	DK03+G/DK03+S	DK03SP		0			0	0
0.43	DK03+G/DK03+S	07-DK03-S001		131.202			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
0.44	DK03+G/DK03+S	07-DK03-S003		128.135			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
0.45	DK03+G/DK03+S	07-DK03-S005		128.135			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3

ID No.	Assy Name	Part Name	Part Bevel Length (in)	Part Weld Length (in)	Part Nest Mark Length (in)	Is Flanged	Weld_Type_Side_1	Weld_Type_Side_2
0.46	DK03+G/DK03+S	07-DK03-S006		116.625			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
0.47	DK03+G/DK03+S	07-DK03-S053		6			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
0.48	DK01+03/DK03+G	DK03+S		0			0	0
0.49	DK01+03/DK03+G	07-DK03-P011		146.375	324.71	True	T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875x2.5x10+4
0.50	DK01+03/DK03+G	07-DK03-P037		123.043	302.86	True	T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875x2.5x10+4
0.51	DK01+03/DK03+G	07-DK03-P038		123.043	308.62	True	T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875x2.5x10+4
0.52	BS01/DK01+03	DK01+G		0			0	0
0.53	BS01/DK01+03	DK03+G		146.0357			B L 1 G F 0.25	0
0.54	DK02+S/DK02	07-DK02-P003		431	1,286.60	False	B L 1 G F 0.25	0
0.55	DK02+S/DK02	07-DK02-P005		0	1,136.41	False	0	0
0.56	DK02+S/DK02	07-DK02-P008		210.25	480.97	False	B L 1 G F 0.25	0
0.57	DK02+S/DK02SP	07-DK02-P024		0	1,686.68	False	0	0
0.58	DK02+G/DK02+S	DK02		0			0	0
0.59	DK02+G/DK02+S	DK02SP		0			0	0
0.60	DK02+G/DK02+S	07-DK02-S001		460.375			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
0.61	DK02+G/DK02+S	07-DK02-S002		460.375			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
0.62	DK02+G/DK02+S	07-DK02-S003		397.5			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
0.63	DK02+G/DK02+S	07-DK02-S004		72.053			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
0.64	DK02+G/DK02+S	07-DK02-S005		374.375			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
0.65	DK02+G/DK02+S	07-DK02-S006		48			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
0.66	DK02+G/DK02+S	07-DK02-S007		48			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
0.67	DK02+G/DK02+S	07-DK02-S008		374.375			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
0.68	DK02+G/DK02+S	07-DK02-S009		37.375			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
0.69	DK02+G/DK02+S	07-DK02-S020		460.375			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
0.70	DK02+G/DK02+S	07-DK02-S032		397.375			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
0.71	DK02+G/DK02+S	07-DK02-S050		46			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
0.72	DK02+G/DK02+S	07-DK02-S054		71.75			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
0.73	DK02+G/DK02+S	07-DK02-S055		71.5			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
0.74	DK02+G/DK02+S	07-DK02-S056		63			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
0.75	DK02+G/DK02+S	07-DK02-S061		14.375			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
0.76	DK02+G/DK02+S	07-DK02-S062		14.375			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
0.77	DK02+04/DK02+G	DK02+S		0			0	0
0.78	DK02+04/DK02+G	07-DK02-F004		76.878			T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875x2.5x10+4
0.79	DK02+04/DK02+G	07-DK02-P009		16.3556	31.93	False	T FLT na F V 0.1875	T FLT na F V 0.1875
0.80	DK02+04/DK02+G	07-DK02-P010		219.5	472.43	True	T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875x2.5x10+4
0.81	DK02+04/DK02+G	07-DK02-P011		221.25	474.00	True	T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875x2.5x10+4
0.82	DK02+04/DK02+G	07-DK02-P014		33.5071	88.78	True	T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875x2.5x10+4
0.83	DK02+04/DK02+G	07-DK02-P015		171.0329	372.30	True	T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875x2.5x10+4
0.84	DK02+04/DK02+G	07-DK02-P016		33.5069	88.78	True	T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875x2.5x10+4
0.85	DK02+04/DK02+G	07-DK02-P017		33.5069	88.78	True	T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875x2.5x10+4
0.86	DK02+04/DK02+G	07-DK02-P021		124.5814	308.62	True	T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875x2.5x10+4
0.87	DK02+04/DK02+G	07-DK02-P026		84.0167	218.52	True	T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875x2.5x10+4
0.88	DK02+04/DK02+G	07-DK02-P027		123.043	308.62	True	T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875x2.5x10+4
0.89	DK02+04/DK02+G	07-DK02-P029		123.043	308.62	True	T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875x2.5x10+4
0.90	DK02+04/DK02+G	07-DK02-P032		123.043	308.62	True	T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875x2.5x10+4

ID No.	Assy Name	Part Name	Part Bevel Length (in)	Part Weld Length (in)	Part Nest Mark Length (in)	Is Flanged	Weld_Type_Side_1	Weld_Type_Side_2
0.91	DK02+04/DK02+G	07-DK02-P042		123.043	297.10	True	T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
0.92	DK02+04/DK02+G	07-DK02-P062		16.9746	34.52	False	T_FLT_na_F_V_0.25	T_FLT_na_F_V_0.25
0.93	DK02+04/DK02+G	07-LB02-P002		15.5	63.22	False	L_FLT_na_F_H_0.25	L_FLT_na_F_H_0.25
0.94	DK04+S/DK04	07-DK04-P010		0	556.75	False	0	0
0.95	DK04+S/DK04	07-DK04-P011		122.047	633.91	False	B_L_1_G_F_0.25	0
0.96	DK04+S/DK04SP	07-DK04-P012		0	1,029.56	False	0	0
0.97	DK04+G/DK04+S	DK04		0			0	0
0.98	DK04+G/DK04+S	DK04SP		0			0	0
0.99	DK04+G/DK04+S	07-DK04-S001		128.164			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
1.00	DK04+G/DK04+S	07-DK04-S002		23.885			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
1.01	DK04+G/DK04+S	07-DK04-S005		6			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
1.02	DK04+G/DK04+S	07-DK04-S006		120.749			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
1.03	DK04+G/DK04+S	07-DK04-S010		107.125			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
1.04	DK04+G/DK04+S	07-DK04-S013		131.237			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
1.05	DK04+G/DK04+S	07-DK04-S065		47.69			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
1.06	DK02+04/DK04+G	DK04+S		0			0	0
1.07	DK02+04/DK04+G	07-DK04-P002		147.625	329.11	True	T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
1.08	DK02+04/DK04+G	07-DK04-P043		123.043	302.86	True	T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
1.09	DK02+04/DK04+G	07-DK04-P044		123.043	308.62	True	T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
1.10	DK02+04/DK04+G	07-DK04-P046		77.2654	204.54	True	T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
1.11	BS01/DK02+04	DK02+G		0			0	0
1.12	BS01/DK02+04	DK04+G		146.0357			B_L_1_G_F_0.25	0
1.13	BS02/BS01	DK01+03		0			0	0
1.14	BS02/BS01	DK02+04		538.5841			B_L_1_G_F_0.25	0
1.15	BS02/BS01	07-DK01-P001		146.2786	351.01	True	T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
1.16	BS02/BS01	07-DK01-P013		146.2786	34.02	False	T_FLT_na_F_V_0.1875	T_FLT_na_F_V_0.1875
1.17	BS02/BS01	07-DK01-P025		16.7197	356.75	True	T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
1.18	BS02/BS01	07-DK01-P028		14.97	34.52	False	T_FLT_na_F_V_0.1875	T_FLT_na_F_V_0.1875
1.19	BS02/BS01	07-DK02-P013		16.7197	34.02	False	T_FLT_na_F_V_0.1875	T_FLT_na_F_V_0.1875
1.20	BS02/BS01	07-DK02-P028		20.0947	34.52	False	T_FLT_na_F_V_0.1875	T_FLT_na_F_V_0.1875
1.21	BS02/BS01	07-DK03-P002		142.7781	356.75	True	T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
1.22	BS02/BS01	07-DK03-P004		142.7781	356.75	True	T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
1.23	BS02/BS01	07-DK03-P006		20.0947	34.32	False	T_FLT_na_F_V_0.1875	T_FLT_na_F_V_0.1875
1.24	BS02/BS01	07-DK03-P007		16.7197	33.82	False	T_FLT_na_F_V_0.1875	T_FLT_na_F_V_0.1875
1.25	BS02/BS01	07-DK03-P013		16.7197	34.02	False	T_FLT_na_F_V_0.1875	T_FLT_na_F_V_0.1875
1.26	BS02/BS01	07-DK03-P026		20.095	34.32	False	T_FLT_na_F_V_0.1875	T_FLT_na_F_V_0.1875
1.27	BS02/BS01	07-DK03-P027		16.7197	33.82	False	T_FLT_na_F_V_0.1875	T_FLT_na_F_V_0.1875
1.28	BS02/BS01	07-DK03-P028		20.0947	34.52	False	T_FLT_na_F_V_0.1875	T_FLT_na_F_V_0.1875
1.29	BS02/BS01	07-DK03-P045		140.6259	351.01	True	T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
1.30	LB01+03/LB01	07-LB01-P002		43.25	149.34	True	T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
1.31	LB01+03/LB01	07-LB01-P003		0	1,674.91	False	0	0
1.32	LB01+03/LB01	07-LB01-P004		93.25	249.85	True	T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
1.33	LB01+03/LB01	07-LB01-P005		100.927	228.98	False	B_L_1_G_F_0.25	0
1.34	LB01+03/LB01	07-LB01-P006		93.25	249.85	True	T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
1.35	LB01+03/LB01	07-LB01-P007		93.25	249.85	True	T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4

ID No.	Assy Name	Part Name	Part Bevel Length (in)	Part Weld Length (in)	Part Nest Mark Length (in)	Is Flanged	Weld_Type_Side_1	Weld_Type_Side_2
1.36	LB01+03/LB01	07-LB01-P008		93.25	249.85	True	T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875x2.5x10+4
1.37	LB01+03/LB01	07-LB01-P010		93.25	249.85	True	T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875x2.5x10+4
1.38	LB01+03/LB01	07-LB01-S001		8.75			T FLT na F F 0.125x2.5x10+4	T FLT na F F 0.125x2.5x10+4
1.39	LB01+03/LB01	07-LB01-S003		415.625			T FLT na F F 0.125x2.5x10+4	T FLT na F F 0.125x2.5x10+4
1.40	LB01+03/LB01	07-LB01-S004		46			T FLT na F F 0.125x2.5x10+4	T FLT na F F 0.125x2.5x10+4
1.41	LB01+03/LB01	07-LB01-S006		343.875			T FLT na F F 0.125x2.5x10+4	T FLT na F F 0.125x2.5x10+4
1.42	LB01+03/LB01	07-LB01-S007		8.75			T FLT na F F 0.125x2.5x10+4	T FLT na F F 0.125x2.5x10+4
1.43	LB01+03/LB01	07-LB01-S009		343.875			T FLT na F F 0.125x2.5x10+4	T FLT na F F 0.125x2.5x10+4
1.44	LB01+03/LB01	07-LB01-S010		27			T FLT na F F 0.125x2.5x10+4	T FLT na F F 0.125x2.5x10+4
1.45	LB01+03/LB01	07-LB01-S011		101.005			T FLT na F V 0.1875	T FLT na F F 0.1875x2.5x10+4
1.46	LB01+03/LB01	BKT092		19.463	29.15	False	T FLT na F V 0.1875	T FLT na F F 0.1875x2.5x10+4
1.47	LB01+03/LB03	07-LB03-P005		0	234.35	True	0	0
1.48	LB01+03/LB03	07-LB03-P009		94.6875	695.88	False	T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875x2.5x10+4
1.49	LB01+03/LB03	07-LB03-S008		77.75			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
1.50	LB01+03/LB03	07-LB03-S018		42.625			T FLT na F F 0.125x2.5x10+4	T FLT na F F 0.125x2.5x10+4
1.51	LB01+03/LB03	07-LB03-S019		42.625			T FLT na F F 0.125x2.5x10+4	T FLT na F F 0.125x2.5x10+4
1.52	LB01+03S/LB01+03	LB01		0			0	0
1.53	LB01+03S/LB01+03	LB03		100.75			B L 1 G F 0.25	0
1.54	VT01/LB05	07-LB05-P001		45.75	176.16	False	T FLT na F H 0.1875	T FLT na F F 0.125x2.5x10+4
1.55	VT01/LB05	07-LB05-P002		0	302.14	False	0	0
1.56	VT01/LB05	07-LB05-S001		45.75			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
1.57	VT01/LB05	07-LB05-S002		58.208			T FLT na F F 0.125x2.5x10+4	T FLT na F F 0.125x2.5x10+4
1.58	VT01/TB41S	07-TB41S-P001		0	285.34	False	0	0
1.59	VT01/TB41S	07-TB41S-S001		57.085			T FLT na F F 0.125x2.5x10+4	T FLT na F F 0.125x2.5x10+4
1.60	VT01/TB41S	07-TB41S-S002		56.761			T FLT na F F 0.125x2.5x10+4	T FLT na F F 0.125x2.5x10+4
1.61	VT01/TB41S	07-TB41S-S003		39.5			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
1.62	VT01/TB39S	07-TB39S-P001		0	285.34	False	0	0
1.63	VT01/TB39S	07-TB39S-S002		57.085			T FLT na F F 0.125x2.5x10+4	T FLT na F F 0.125x2.5x10+4
1.64	VT01/TB39S	07-TB39S-S003		56.761			T FLT na F F 0.125x2.5x10+4	T FLT na F F 0.125x2.5x10+4
1.65	VT01/TB39S	07-TB39S-S004		39.5			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
1.66	LB01+03S/VT01	LB05		0			0	0
1.67	LB01+03S/VT01	TB39S		141.0686			T FLT na F H 0.1875	T FLT na F F 0.125x2.5x10+4
1.68	LB01+03S/VT01	TB41S		141.0686			T FLT na F H 0.1875	T FLT na F F 0.125x2.5x10+4
1.69	LB01+03S/DP01	07-DP01-P001		0	155.75	False	0	0
1.70	LB01+03S/DP01	07-DP01-P002		37	217.00	False	T FLT na F V 0.125	T FLT na F V 0.125
1.71	LB01+03S/DP01	07-DP01-P003		99.9103	199.82	False	T FLT na F V 0.125	T FLT na F V 0.125
1.72	LB01+03S/DP01	07-DP01-P004		99.9103	199.50	False	T FLT na F V 0.125	T FLT na F V 0.125
1.73	BS02/LB01+03S	DP01		273.8206			T FLT na F V 0.125	T FLT na F F 0.125x2.5x10+4
1.74	BS02/LB01+03S	LB01+03		0			0	0
1.75	BS02/LB01+03S	VT01		188.75			T FLT na F V 0.125	T FLT na F F 0.125x2.5x10+4
1.76	LB02+04/LB02	07-LB02-P001		43.25	149.34	True	T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875x2.5x10+4
1.77	LB02+04/LB02	07-LB02-P007		100.9265	228.98	False	B L 1 G F 0.25	0
1.78	LB02+04/LB02	07-LB02-P009		93.25	249.85	True	T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875x2.5x10+4
1.79	LB02+04/LB02	07-LB02-P011		0	1,674.91	False	0	0
1.80	LB02+04/LB02	07-LB02-S001		8.75			T FLT na F F 0.125x2.5x10+4	T FLT na F F 0.125x2.5x10+4

ID No.	Assy Name	Part Name	Part Bevel Length (in)	Part Weld Length (in)	Part Nest Mark Length (in)	Is Flanged	Weld_Type_Side_1	Weld_Type_Side_2
1.81	LB02+04/LB02	07-LB02-S002		8.75			T FLT na F F 0.125x2.5x10+4	T FLT na F F 0.125x2.5x10+4
1.82	LB02+04/LB02	07-LB02-S004		46			T FLT na F F 0.125x2.5x10+4	T FLT na F F 0.125x2.5x10+4
1.83	LB02+04/LB02	07-LB02-S005		343.875			T FLT na F F 0.125x2.5x10+4	T FLT na F F 0.125x2.5x10+4
1.84	LB02+04/LB02	07-LB02-S006		343.875			T FLT na F F 0.125x2.5x10+4	T FLT na F F 0.125x2.5x10+4
1.85	LB02+04/LB02	07-LB02-S007		415.625			T FLT na F F 0.125x2.5x10+4	T FLT na F F 0.125x2.5x10+4
1.86	LB02+04/LB02	07-LB02-S008		8.75			T FLT na F F 0.125x2.5x10+4	T FLT na F F 0.125x2.5x10+4
1.87	LB02+04/LB02	07-LB02-S009		101.005			T FLT na F V 0.1875	T FLT na F F 0.1875x2.5x10+4
1.88	LB02+04/LB02	07-LB02-S010		27			T FLT na F F 0.125x2.5x10+4	T FLT na F F 0.125x2.5x10+4
1.89	LB02+04/LB02	BKT092		19.463	29.15	False	T FLT na F V 0.1875	T FLT na F F 0.1875x2.5x10+4
1.90	LB02+04/LB04	07-LB04-P001		93.25	234.35	True	T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875x2.5x10+4
1.91	LB02+04/LB04	07-LB04-P002		0	695.88	False	0	0
1.92	LB02+04/LB04	07-LB04-S004		39.625			T FLT na F F 0.125x2.5x10+4	T FLT na F F 0.125x2.5x10+4
1.93	LB02+04/LB04	07-LB04-S008		77.75			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
1.94	LB02+04/LB04	07-LB04-S012		39.625			T FLT na F F 0.125x2.5x10+4	T FLT na F F 0.125x2.5x10+4
1.95	LB02+04P/LB02+04	LB02		0			0	0
1.96	LB02+04P/LB02+04	LB04		100.75			B L 1 G F 0.25	0
1.97	VT02/LB06	07-LB06-P001		0	302.14	False	0	0
1.98	VT02/LB06	07-LB06-P002		45.75	176.16	False	T FLT na F H 0.1875	T FLT na F F 0.125x2.5x10+4
1.99	VT02/LB06	07-LB06-S001		45.75			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
2.00	VT02/LB06	07-LB06-S002		58.208			T FLT na F F 0.125x2.5x10+4	T FLT na F F 0.125x2.5x10+4
2.01	VT02/TB41P	07-TB41P-P001		0	285.34	False	0	0
2.02	VT02/TB41P	07-TB41P-S001		39.5			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
2.03	VT02/TB41P	07-TB41P-S002		56.761			T FLT na F F 0.125x2.5x10+4	T FLT na F F 0.125x2.5x10+4
2.04	VT02/TB41P	07-TB41P-S003		57.085			T FLT na F F 0.125x2.5x10+4	T FLT na F F 0.125x2.5x10+4
2.05	VT02/TB39P	07-TB39P-P001		0	285.34	False	0	0
2.06	VT02/TB39P	07-TB39P-S001		39.5			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
2.07	VT02/TB39P	07-TB39P-S002		56.761			T FLT na F F 0.125x2.5x10+4	T FLT na F F 0.125x2.5x10+4
2.08	VT02/TB39P	07-TB39P-S003		57.085			T FLT na F F 0.125x2.5x10+4	T FLT na F F 0.125x2.5x10+4
2.09	LB02+04P/VT02	LB06		0			0	0
2.10	LB02+04P/VT02	TB39P		141.0686			T FLT na F H 0.1875	T FLT na F F 0.125x2.5x10+4
2.11	LB02+04P/VT02	TB41P		141.0686			T FLT na F H 0.1875	T FLT na F F 0.125x2.5x10+4
2.12	LB02+04P/DP02	07-DP02-P001		0	155.75	False	0	0
2.13	LB02+04P/DP02	07-DP02-P002		37	217.00	False	T FLT na F V 0.125	T FLT na F V 0.125
2.14	LB02+04P/DP02	07-DP02-P003		99.9103	199.82	False	T FLT na F V 0.125	T FLT na F V 0.125
2.15	LB02+04P/DP02	07-DP02-P004		99.9103	199.50	False	T FLT na F V 0.125	T FLT na F V 0.125
2.16	BS02/LB02+04P	DP02		273.8206			T FLT na F V 0.125	T FLT na F F 0.125x2.5x10+4
2.17	BS02/LB02+04P	LB02+04		0			0	0
2.18	BS02/LB02+04P	VT02		188.75			T FLT na F V 0.125	T FLT na F F 0.125x2.5x10+4
2.19	BS02/TB63S	07-TB63S-P001		0	466.18	False	0	0
2.20	BS02/TB63S	07-TB63S-S001		45.75			T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875x2.5x10+4
2.21	BS02/TB63S	07-TB63S-S002		57.511			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
2.22	BS02/TB63S	07-TB63S-S003		57.835			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
2.23	BS02/TB63S	07-TB63S-S004		48			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
2.24	BS02/TB63S	07-TB63S-S005		45.868			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
2.25	BS02/TB63S	07-TB63S-S006		46.338			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3

ID No.	Assy Name	Part Name	Part Bevel Length (in)	Part Weld Length (in)	Part Nest Mark Length (in)	Is Flanged	Weld_Type_Side_1	Weld_Type_Side_2
2.26	BS02/TB63S	07-TB63S-S007		48			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
2.27	BS02/TB63S	07-TB63S-S008		46.809			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
2.28	BS02/TB63P	07-TB63P-P001		0	299.47	False	0	0
2.29	BS02/TB63P	07-TB63P-S001		45.75			T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875x2.5x10+4
2.30	BS02/TB63P	07-TB63P-S002		57.835			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
2.31	BS02/TB63P	07-TB63P-S003		57.511			T FLT na F F 0.1875x2.5x12+3	T FLT na F F 0.1875x2.5x12+3
2.32	BS03/BS02	BS01		0			0	0
2.33	BS03/BS02	LB01+03S		945.3125			T FLT na F H 0.1875	T FLT na F F 0.1875x2.5x10+4
2.34	BS03/BS02	LB02+04P		945.3125			T FLT na F H 0.1875	T FLT na F F 0.1875x2.5x10+4
2.35	BS03/BS02	TB63P		150.2059			T FLT na F H 0.1875	T FLT na F F 0.1875x2.5x10+4
2.36	BS03/BS02	TB63S		231.0049			T FLT na F H 0.1875	T FLT na F F 0.1875x2.5x10+4
2.37	BS03/BS02	07-DK03-P031		23	68.33	False	T FLT na F H 0.1875	T FLT na F H 0.1875
2.38	BS03/SN01	07-SN01-S025		0			0	0
2.39	BS03/SN01	BKT096		16	23.15	False	T FLT na F H 0.1875	0
2.40	BS04/BS03	BS02		0			0	0
2.41	BS04/BS03	SN01		512			T FLT na F H 0.1875	0
2.42	BS04/BS03	07-DK01-F002		97			T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875
2.43	BS04/BS03	07-DK01-F003		204.5			T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875
2.44	BS04/BS03	07-DK01-P007		43.4267	102.70	False	T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875
2.45	BS04/BS03	07-DK01-P010		43.4267	104.92	True	T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875
2.46	BS04/BS03	07-DK01-S063		173.727			T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875
2.47	BS04/BS03	07-DK02-F002		97			T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875
2.48	BS04/BS03	07-DK02-F003		204.5			T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875
2.49	BS04/BS03	07-DK02-P001		43.4267	102.70	False	T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875
2.50	BS04/BS03	07-DK02-P019		43.4267	104.92	True	T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875
2.51	BS04/BS03	07-DK02-S046		173.727			T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875
2.52	BS04/BS03	07-DK03-F002		281.743			T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875
2.53	BS04/BS03	07-DK04-F001		281.743			T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875
2.54	BS04/BS03	07-LB01-S012		101.489			T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875
2.55	BS04/BS03	07-LB02-S023		101.489			T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875
2.56	BS04/BS03	BKT095		6	18.02	False	T FLT na F V 0.25	T FLT na F V 0.25
2.57	BS04/ST01S	07-ST01S-P001		0	283.78	False	0	0
2.58	BS04/ST01S	07-ST01S-P002		21	81.00	True	T FLT na F V 0.125	T FLT na F V 0.125
2.59	BS04/ST01S	07-ST01S-S027		0			0	0
2.60	BS04/ST01P	07-ST01P-P001		0	283.78	False	0	0
2.61	BS04/ST01P	07-ST01P-P002		21	81.00	True	T FLT na F V 0.125	T FLT na F V 0.125
2.62	BS04/ST01P	07-ST01P-S029		0			0	0
2.63	BS04/ST02	07-ST02-P001		0	155.50	False	0	0
2.64	BS04/ST02	07-ST02-P002		33.75	151.50	False	T FLT na F V 0.125	T FLT na F V 0.125
2.65	BS04/ST02	07-ST02-P003		33.75	151.50	False	T FLT na F V 0.125	T FLT na F V 0.125
2.66	BS04/ST02	07-ST02-P004		47	92.00	False	T FLT na F V 0.125	T FLT na F V 0.125
2.67	BS04/ST02	07-ST02-P005		66	111.50	False	T FLT na F V 0.125	T FLT na F V 0.125
2.68	BS04/ST02	07-ST02-P006		57.4	102.50	False	T FLT na F V 0.125	T FLT na F V 0.125
2.69	BS04/ST02	07-ST02-P007		66	111.50	False	T FLT na F V 0.125	T FLT na F V 0.125
2.70	BS04/ST02	07-ST02-P008		57.5	102.52	False	T FLT na F V 0.125	T FLT na F V 0.125

ID No.	Assy Name	Part Name	Part Bevel Length (in)	Part Weld Length (in)	Part Nest Mark Length (in)	Is Flanged	Weld_Type_Side_1	Weld_Type_Side_2
2.71	BS04/ST02	07-ST02-S025		40			T_FLT_na_F_V_0.125	0
2.72	BS04/ST02	07-ST02-S026		40			T_FLT_na_F_V_0.125	0
2.73	BS04/ST02	07-ST02-S028		47.375			T_FLT_na_F_V_0.125	0
2.74	BS04/ST03S	07-ST03S-P007		21	98.00	True	T_FLT_na_F_V_0.125	T_FLT_na_F_V_0.125
2.75	BS04/ST03S	07-ST03S-P018		0	94.07	False	0	0
2.76	BS04/ST03S	07-ST03S-P020		0	93.20	False	0	0
2.77	BS04/ST03P	07-ST03P-P019		0	93.20	False	0	0
2.78	BS04/ST03P	07-ST03P-P021		21	98.00	True	T_FLT_na_F_V_0.125	T_FLT_na_F_V_0.125
2.79	BS04/ST03P	07-ST03P-P022		0	94.07	False	0	0
2.80	GE/BS04	BS03		0			0	0
2.81	GE/BS04	ST01P		283.95			T_FLT_na_F_F_0.125x2.5x10+4	0
2.82	GE/BS04	ST01S		283.95			T_FLT_na_F_F_0.125x2.5x10+4	0
2.83	GE/BS04	ST02		115.5			T_FLT_na_F_F_0.125	T_FLT_na_F_F_0.125x2.5x10+4
2.84	GE/BS04	ST03P		53			T_FLT_na_F_F_0.125	T_FLT_na_F_F_0.125x2.5x10+4
2.85	GE/BS04	ST03S		53			T_FLT_na_F_F_0.125	T_FLT_na_F_F_0.125x2.5x10+4
2.86	GE/BS04	07-DK01-P015		67.5	129.38	False	T_FLT_na_F_F_0.125	0
2.87	GE/BS04	07-DK01-P019		77.5	129.38	False	T_FLT_na_F_F_0.125	0
2.88	GE/BS04	07-DK02-P004		67.5	129.38	False	T_FLT_na_F_F_0.125	0
2.89	GE/BS04	07-DK02-P007		77.5	129.38	False	T_FLT_na_F_F_0.125	0



**APPENDIX L**

ID No.	Assy Name	Part Name	Qty	Total_mhr_per_Part	PL_Cut_Time (min.)	PL_Mark_Time (min.)	PL_Handle_Time_to_Beveling_Station (min.)	PL_Bevel_Time (min.)	PL_Handle_Time_to_Assy_Station (min.)	PL_Fit_Time (min.)
0.01	DK01+S/DK01	07-DK01-P002	1	4	6.46	5.17			4.00	180.00
0.02	DK01+S/DK01	07-DK01-P009	1	3	2.40	1.92			4.00	180.00
0.03	DK01+S/DK01	07-DK01-P023	1	3	5.65	4.52			4.00	180.00
0.04	DK01+S/DK01SP	07-DK01-P039	1	0						
0.05	DK01+G/DK01+S	DK01	1	4						
0.06	DK01+G/DK01+S	DK01SP		0						
0.07	DK01+G/DK01+S	07-DK01-S001	2	3						
0.08	DK01+G/DK01+S	07-DK01-S002	3	5						
0.09	DK01+G/DK01+S	07-DK01-S003	1	0						
0.10	DK01+G/DK01+S	07-DK01-S004	1	0						
0.11	DK01+G/DK01+S	07-DK01-S007	1	2						
0.12	DK01+G/DK01+S	07-DK01-S008	1	1						
0.13	DK01+G/DK01+S	07-DK01-S009	1	0						
0.14	DK01+G/DK01+S	07-DK01-S016	1	2						
0.15	DK01+G/DK01+S	07-DK01-S036	1	0						
0.16	DK01+G/DK01+S	07-DK01-S050	2	1						
0.17	DK01+G/DK01+S	07-DK01-S051	1	0						
0.18	DK01+G/DK01+S	07-DK01-S054	1	1						
0.19	DK01+G/DK01+S	07-DK01-S055	1	1						
0.20	DK01+G/DK01+S	07-DK01-S056	1	1						
0.21	DK01+03/DK01+G	DK01+S	1	5						
0.22	DK01+03/DK01+G	07-DK01-F001	1	1						
0.23	DK01+03/DK01+G	07-DK01-P003	1	2	3.37	1.89				
0.24	DK01+03/DK01+G	07-DK01-P004	1	2	3.39	1.90				
0.25	DK01+03/DK01+G	07-DK01-P005	1	1	1.56	0.87				
0.26	DK01+03/DK01+G	07-DK01-P008	1	1	0.45	0.25			2.00	70.00
0.27	DK01+03/DK01+G	07-DK01-P012	1	1	0.44	0.36				
0.28	DK01+03/DK01+G	07-DK01-P014	1	1	2.20	1.23				
0.29	DK01+03/DK01+G	07-DK01-P016	1	1	0.44	0.36				
0.30	DK01+03/DK01+G	07-DK01-P017	1	1	0.44	0.36				
0.31	DK01+03/DK01+G	07-DK01-P018	1	1	0.20	0.14			2.00	70.00
0.32	DK01+03/DK01+G	07-DK01-P020	1	1	2.20	1.23				
0.33	DK01+03/DK01+G	07-DK01-P022	1	1	0.18	0.13			2.00	70.00
0.34	DK01+03/DK01+G	07-DK01-P030	1	1	2.20	1.23				
0.35	DK01+03/DK01+G	07-DK01-P033	1	1	2.20	1.23				
0.36	DK01+03/DK01+G	07-DK01-P036	1	1	2.12	1.19				
0.37	DK01+03/DK01+G	07-DK01-P061	1	2	2.66	1.49				
0.38	DK03+S/DK03	07-DK03-P015	1	3	2.75	2.20			4.00	180.00
0.39	DK03+S/DK03	07-DK03-P021	1	3	3.19	2.55			4.00	180.00
0.40	DK03+S/DK03SP	07-DK03-P001	1	0						
0.41	DK03+G/DK03+S	DK03	1	4						
0.42	DK03+G/DK03+S	DK03SP	0	0						

ID No.	Assy Name	Part Name	Qty	Total_mhr_per_Part	PL_Cut_Time (min.)	PL_Mark_Time (min.)	PL_Handle_Time_to_Beveling_Station (min.)	PL_Bevel_Time (min.)	PL_Handle_Time_to_Assy_Station (min.)	PL_Fit_Time (min.)
0.43	DK03+G/DK03+S	07-DK03-S001	2	1						
0.44	DK03+G/DK03+S	07-DK03-S003	3	2						
0.45	DK03+G/DK03+S	07-DK03-S005	1	1						
0.46	DK03+G/DK03+S	07-DK03-S006	1	1						
0.47	DK03+G/DK03+S	07-DK03-S053	5	1						
0.48	DK01+03/DK03+G	DK03+S	1	4						
0.49	DK01+03/DK03+G	07-DK03-P011	1	1	2.32	1.30				
0.50	DK01+03/DK03+G	07-DK03-P037	1	1	2.16	1.21				
0.51	DK01+03/DK03+G	07-DK03-P038	1	1	2.20	1.23				
0.52	BS01/DK01+03	DK01+G	1	5						
0.53	BS01/DK01+03	DK03+G	1	4						
0.54	DK02+S/DK02	07-DK02-P003	1	4	6.43	5.15			4.00	180.00
0.55	DK02+S/DK02	07-DK02-P005	1	3	5.68	4.55			4.00	180.00
0.56	DK02+S/DK02	07-DK02-P008	1	3	2.40	1.92			4.00	180.00
0.57	DK02+S/DK02SP	07-DK02-P024	1	0						
0.58	DK02+G/DK02+S	DK02	1	4						
0.59	DK02+G/DK02+S	DK02SP	0	0						
0.60	DK02+G/DK02+S	07-DK02-S001	1	2						
0.61	DK02+G/DK02+S	07-DK02-S002	1	2						
0.62	DK02+G/DK02+S	07-DK02-S003	2	3						
0.63	DK02+G/DK02+S	07-DK02-S004	1	1						
0.64	DK02+G/DK02+S	07-DK02-S005	1	2						
0.65	DK02+G/DK02+S	07-DK02-S006	1	0						
0.66	DK02+G/DK02+S	07-DK02-S007	1	0						
0.67	DK02+G/DK02+S	07-DK02-S008	1	2						
0.68	DK02+G/DK02+S	07-DK02-S009	1	0						
0.69	DK02+G/DK02+S	07-DK02-S020	1	2						
0.70	DK02+G/DK02+S	07-DK02-S032	1	1						
0.71	DK02+G/DK02+S	07-DK02-S050	2	1						
0.72	DK02+G/DK02+S	07-DK02-S054	1	1						
0.73	DK02+G/DK02+S	07-DK02-S055	1	1						
0.74	DK02+G/DK02+S	07-DK02-S056	1	1						
0.75	DK02+G/DK02+S	07-DK02-S061	1	0						
0.76	DK02+G/DK02+S	07-DK02-S062	1	0						
0.77	DK02+04/DK02+G	DK02+S	1	5						
0.78	DK02+04/DK02+G	07-DK02-F004	1	1						
0.79	DK02+04/DK02+G	07-DK02-P009	1	1	0.18	0.13			2.00	70.00
0.80	DK02+04/DK02+G	07-DK02-P010	1	2	3.37	1.89				
0.81	DK02+04/DK02+G	07-DK02-P011	1	2	3.39	1.90				
0.82	DK02+04/DK02+G	07-DK02-P014	1	1	0.44	0.36				
0.83	DK02+04/DK02+G	07-DK02-P015	1	2	2.66	1.49				
0.84	DK02+04/DK02+G	07-DK02-P016	1	1	0.44	0.36				

ID No.	Assy Name	Part Name	Qty	Total_mhr_per_Part	PL_Cut_Time (min.)	PL_Mark_Time (min.)	PL_Handle_Time_to_Beveling_Station (min.)	PL_Bevel_Time (min.)	PL_Handle_Time_to_Assy_Station (min.)	PL_Fit_Time (min.)
0.85	DK02+04/DK02+G	07-DK02-P017	1	1	0.44	0.36				
0.86	DK02+04/DK02+G	07-DK02-P021	1	1	2.20	1.23				
0.87	DK02+04/DK02+G	07-DK02-P026	1	1	1.56	0.87				
0.88	DK02+04/DK02+G	07-DK02-P027	1	1	2.20	1.23				
0.89	DK02+04/DK02+G	07-DK02-P029	1	1	2.20	1.23				
0.90	DK02+04/DK02+G	07-DK02-P032	1	1	2.20	1.23				
0.91	DK02+04/DK02+G	07-DK02-P042	1	1	2.12	1.19				
0.92	DK02+04/DK02+G	07-DK02-P062	1	1	0.20	0.14			2.00	70.00
0.93	DK02+04/DK02+G	07-LB02-P002	1	1	0.45	0.25			2.00	70.00
0.94	DK04+S/DK04	07-DK04-P010	1	3	2.78	2.23			4.00	180.00
0.95	DK04+S/DK04	07-DK04-P011	1	3	3.17	2.54			4.00	180.00
0.96	DK04+S/DK04SP	07-DK04-P012	1	0						
0.97	DK04+G/DK04+S	DK04	1	4						
0.98	DK04+G/DK04+S	DK04SP	1	0						
0.99	DK04+G/DK04+S	07-DK04-S001	2	1						
1.00	DK04+G/DK04+S	07-DK04-S002	1	0						
1.01	DK04+G/DK04+S	07-DK04-S005	2	0						
1.02	DK04+G/DK04+S	07-DK04-S006	1	1						
1.03	DK04+G/DK04+S	07-DK04-S010	1	1						
1.04	DK04+G/DK04+S	07-DK04-S013	4	3						
1.05	DK04+G/DK04+S	07-DK04-S065	1	0						
1.06	DK02+04/DK04+G	DK04+S	1	4						
1.07	DK02+04/DK04+G	07-DK04-P002	1	1	2.35	1.32				
1.08	DK02+04/DK04+G	07-DK04-P043	1	1	2.16	1.21				
1.09	DK02+04/DK04+G	07-DK04-P044	1	1	2.20	1.23				
1.10	DK02+04/DK04+G	07-DK04-P046	1	1	1.46	0.82				
1.11	BS01/DK02+04	DK02+G	1	5						
1.12	BS01/DK02+04	DK04+G	1	4						
1.13	BS02/BS01	DK01+03	1	5						
1.14	BS02/BS01	DK02+04	1	6						
1.15	BS02/BS01	07-DK01-P001	1	1	2.51	1.40				
1.16	BS02/BS01	07-DK01-P013	4	10	0.78	0.54			8.00	280.00
1.17	BS02/BS01	07-DK01-P025	5	5	12.74	7.13				
1.18	BS02/BS01	07-DK01-P028	4	5	0.79	0.55			8.00	280.00
1.19	BS02/BS01	07-DK02-P013	4	5	0.78	0.54			8.00	280.00
1.20	BS02/BS01	07-DK02-P028	4	6	0.79	0.55			8.00	280.00
1.21	BS02/BS01	07-DK03-P002	1	1	2.55	1.43				
1.22	BS02/BS01	07-DK03-P004	1	1	2.55	1.43				
1.23	BS02/BS01	07-DK03-P006	1	1	0.20	0.14			2.00	70.00
1.24	BS02/BS01	07-DK03-P007	1	1	0.19	0.14			2.00	70.00
1.25	BS02/BS01	07-DK03-P013	2	3	0.39	0.27			4.00	140.00
1.26	BS02/BS01	07-DK03-P026	1	1	0.20	0.14			2.00	70.00

ID No.	Assy Name	Part Name	Qty	Total_mhr_per_Part	PL_Cut_Time (min.)	PL_Mark_Time (min.)	PL_Handle_Time_to_Beveling_Station (min.)	PL_Bevel_Time (min.)	PL_Handle_Time_to_Assy_Station (min.)	PL_Fit_Time (min.)
1.27	BS02/BS01	07-DK03-P027	1	1	0.19	0.14			2.00	70.00
1.28	BS02/BS01	07-DK03-P028	2	3	0.39	0.28			4.00	140.00
1.29	BS02/BS01	07-DK03-P045	1	1	2.51	1.40				
1.30	LB01+03/LB01	07-LB01-P002	1	1	1.07	0.60				
1.31	LB01+03/LB01	07-LB01-P003	1	3	8.37	6.70			4.00	180.00
1.32	LB01+03/LB01	07-LB01-P004	1	1	1.78	1.00				
1.33	LB01+03/LB01	07-LB01-P005	1	1	1.14	0.92			4.00	70.00
1.34	LB01+03/LB01	07-LB01-P006	1	1	1.78	1.00				
1.35	LB01+03/LB01	07-LB01-P007	1	1	1.78	1.00				
1.36	LB01+03/LB01	07-LB01-P008	1	1	1.78	1.00				
1.37	LB01+03/LB01	07-LB01-P010	1	1	1.78	1.00				
1.38	LB01+03/LB01	07-LB01-S001	2	1						
1.39	LB01+03/LB01	07-LB01-S003	1	2						
1.40	LB01+03/LB01	07-LB01-S004	1	0						
1.41	LB01+03/LB01	07-LB01-S006	1	2						
1.42	LB01+03/LB01	07-LB01-S007	1	0						
1.43	LB01+03/LB01	07-LB01-S009	1	2						
1.44	LB01+03/LB01	07-LB01-S010	3	1						
1.45	LB01+03/LB01	07-LB01-S011	1	1						
1.46	LB01+03/LB01	BKT092	3	4	0.44	0.35			6.00	210.00
1.47	LB01+03/LB03	07-LB03-P005	1	1	1.67	0.94				
1.48	LB01+03/LB03	07-LB03-P009	1	4	3.48	2.78			4.00	180.00
1.49	LB01+03/LB03	07-LB03-S008	1	1						
1.50	LB01+03/LB03	07-LB03-S018	1	0						
1.51	LB01+03/LB03	07-LB03-S019	2	1						
1.52	LB01+03S/LB01+03	LB01	1	4						
1.53	LB01+03S/LB01+03	LB03	1	3						
1.54	VT01/LB05	07-LB05-P001	1	1	1.01	0.70			4.00	70.00
1.55	VT01/LB05	07-LB05-P002	1	1	1.51	1.21			4.00	70.00
1.56	VT01/LB05	07-LB05-S001	1	0						
1.57	VT01/LB05	07-LB05-S002	1	1						
1.58	VT01/TB41S	07-TB41S-P001	1	1	1.43	1.14			4.00	70.00
1.59	VT01/TB41S	07-TB41S-S001	1	1						
1.60	VT01/TB41S	07-TB41S-S002	1	1						
1.61	VT01/TB41S	07-TB41S-S003	1	0						
1.62	VT01/TB39S	07-TB39S-P001	1	1	1.43	1.14			4.00	70.00
1.63	VT01/TB39S	07-TB39S-S002	1	1						
1.64	VT01/TB39S	07-TB39S-S003	1	1						
1.65	VT01/TB39S	07-TB39S-S004	1	0						
1.66	LB01+03S/VT01	LB05	1	3						
1.67	LB01+03S/VT01	TB39S	1	4						
1.68	LB01+03S/VT01	TB41S	1	4						

ID No.	Assy Name	Part Name	Qty	Total_mhr_per_Part	PL_Cut_Time (min.)	PL_Mark_Time (min.)	PL_Handle_Time_to_Beveling_Station (min.)	PL_Bevel_Time (min.)	PL_Handle_Time_to_Assy_Station (min.)	PL_Fit_Time (min.)
1.69	LB01+03S/DP01	07-DP01-P001	1	1	0.78	0.62			4.00	70.00
1.70	LB01+03S/DP01	07-DP01-P002	1	2	1.08	0.87			4.00	70.00
1.71	LB01+03S/DP01	07-DP01-P003	1	2	1.00	0.80			4.00	70.00
1.72	LB01+03S/DP01	07-DP01-P004	1	2	1.00	0.80			4.00	70.00
1.73	BS02/LB01+03S	DP01	1	5						
1.74	BS02/LB01+03S	LB01+03	1	4						
1.75	BS02/LB01+03S	VT01	1	5						
1.76	LB02+04/LB02	07-LB02-P001	1	1	1.07	0.60				
1.77	LB02+04/LB02	07-LB02-P007	1	1	1.14	0.92			4.00	70.00
1.78	LB02+04/LB02	07-LB02-P009	5	5	8.92	5.00				
1.79	LB02+04/LB02	07-LB02-P011	1	3	8.37	6.70			4.00	180.00
1.80	LB02+04/LB02	07-LB02-S001	1	0						
1.81	LB02+04/LB02	07-LB02-S002	1	0						
1.82	LB02+04/LB02	07-LB02-S004	1	0						
1.83	LB02+04/LB02	07-LB02-S005	1	2						
1.84	LB02+04/LB02	07-LB02-S006	1	2						
1.85	LB02+04/LB02	07-LB02-S007	1	2						
1.86	LB02+04/LB02	07-LB02-S008	1	0						
1.87	LB02+04/LB02	07-LB02-S009	1	1						
1.88	LB02+04/LB02	07-LB02-S010	3	1						
1.89	LB02+04/LB02	BKT092	3	4	0.44	0.35			6.00	210.00
1.90	LB02+04/LB04	07-LB04-P001	1	1	1.67	0.94				
1.91	LB02+04/LB04	07-LB04-P002	1	3	3.48	2.78			4.00	180.00
1.92	LB02+04/LB04	07-LB04-S004	2	1						
1.93	LB02+04/LB04	07-LB04-S008	1	1						
1.94	LB02+04/LB04	07-LB04-S012	1	0						
1.95	LB02+04P/LB02+04	LB02	1	4						
1.96	LB02+04P/LB02+04	LB04	1	3						
1.97	VT02/LB06	07-LB06-P001	1	1	1.51	1.21			4.00	70.00
1.98	VT02/LB06	07-LB06-P002	1	1	1.01	0.70			4.00	70.00
1.99	VT02/LB06	07-LB06-S001	1	0						
2.00	VT02/LB06	07-LB06-S002	1	1						
2.01	VT02/TB41P	07-TB41P-P001	1	1	1.43	1.14			4.00	70.00
2.02	VT02/TB41P	07-TB41P-S001	1	0						
2.03	VT02/TB41P	07-TB41P-S002	1	1						
2.04	VT02/TB41P	07-TB41P-S003	1	1						
2.05	VT02/TB39P	07-TB39P-P001	1	1	1.43	1.14			4.00	70.00
2.06	VT02/TB39P	07-TB39P-S001	1	0						
2.07	VT02/TB39P	07-TB39P-S002	1	1						
2.08	VT02/TB39P	07-TB39P-S003	1	1						
2.09	LB02+04P/VT02	LB06	1	3						
2.10	LB02+04P/VT02	TB39P	1	4						

ID No.	Assy Name	Part Name	Qty	Total_mhr_per_Part	PL_Cut_Time (min.)	PL_Mark_Time (min.)	PL_Handle_Time_to_Beveling_Station (min.)	PL_Bevel_Time (min.)	PL_Handle_Time_to_Assy_Station (min.)	PL_Fit_Time (min.)
2.11	LB02+04P/VT02	TB41P	1	4						
2.12	LB02+04P/DP02	07-DP02-P001	1	1	0.78	0.62			4.00	70.00
2.13	LB02+04P/DP02	07-DP02-P002	1	2	1.08	0.87			4.00	70.00
2.14	LB02+04P/DP02	07-DP02-P003	1	2	1.00	0.80			4.00	70.00
2.15	LB02+04P/DP02	07-DP02-P004	1	2	1.00	0.80			4.00	70.00
2.16	BS02/LB02+04P	DP02	1	5						
2.17	BS02/LB02+04P	LB02+04	1	4						
2.18	BS02/LB02+04P	VT02	1	5						
2.19	BS02/TB63S	07-TB63S-P001	1	3	2.33	1.86			4.00	180.00
2.20	BS02/TB63S	07-TB63S-S001	1	0						
2.21	BS02/TB63S	07-TB63S-S002	1	0						
2.22	BS02/TB63S	07-TB63S-S003	1	0						
2.23	BS02/TB63S	07-TB63S-S004	2	1						
2.24	BS02/TB63S	07-TB63S-S005	1	0						
2.25	BS02/TB63S	07-TB63S-S006	1	0						
2.26	BS02/TB63S	07-TB63S-S007	1	0						
2.27	BS02/TB63S	07-TB63S-S008	1	0						
2.28	BS02/TB63P	07-TB63P-P001	1	1	1.50	1.20			4.00	70.00
2.29	BS02/TB63P	07-TB63P-S001	1	0						
2.30	BS02/TB63P	07-TB63P-S002	1	0						
2.31	BS02/TB63P	07-TB63P-S003	1	0						
2.32	BS03/BS02	BS01	1	5						
2.33	BS03/BS02	LB01+03S	1	9						
2.34	BS03/BS02	LB02+04P	1	9						
2.35	BS03/BS02	TB63P	1	4						
2.36	BS03/BS02	TB63S	1	5						
2.37	BS03/BS02	07-DK03-P031	1	1	0.39	0.27			2.00	70.00
2.38	BS03/SN01	07-SN01-S025	16	4						
2.39	BS03/SN01	BKT096	32	41	5.29	2.96			64.00	2240.00
2.40	BS04/BS03	BS02	1	5						
2.41	BS04/BS03	SN01	1	6						
2.42	BS04/BS03	07-DK01-F002	1	1						
2.43	BS04/BS03	07-DK01-F003	1	1						
2.44	BS04/BS03	07-DK01-P007	1	1	0.51	0.41			2.00	70.00
2.45	BS04/BS03	07-DK01-P010	1	1	0.52	0.42				
2.46	BS04/BS03	07-DK01-S063	1	1						
2.47	BS04/BS03	07-DK02-F002	1	1						
2.48	BS04/BS03	07-DK02-F003	1	1						
2.49	BS04/BS03	07-DK02-P001	1	1	0.51	0.41			2.00	70.00
2.50	BS04/BS03	07-DK02-P019	1	1	0.52	0.42				
2.51	BS04/BS03	07-DK02-S046	1	1						
2.52	BS04/BS03	07-DK03-F002	1	2						

ID No.	Assy Name	Part Name	Qty	Total_mhr_per_Part	PL_Cut_Time (min.)	PL_Mark_Time (min.)	PL_Handle_Time_to_Beveling_Station (min.)	PL_Bevel_Time (min.)	PL_Handle_Time_to_Assy_Station (min.)	PL_Fit_Time (min.)
2.53	BS04/BS03	07-DK04-F001	1	2						
2.54	BS04/BS03	07-LB01-S012	1	1						
2.55	BS04/BS03	07-LB02-S023	1	1						
2.56	BS04/BS03	BKT095	10	13	1.03	0.72			20.00	700.00
2.57	BS04/ST01S	07-ST01S-P001	1	1	1.42	1.14			4.00	70.00
2.58	BS04/ST01S	07-ST01S-P002	10	5	4.05	3.24				
2.59	BS04/ST01S	07-ST01S-S027	1	1						
2.60	BS04/ST01P	07-ST01P-P001	1	1	1.42	1.14			4.00	70.00
2.61	BS04/ST01P	07-ST01P-P002	10	5	4.05	3.24				
2.62	BS04/ST01P	07-ST01P-S029	1	1						
2.63	BS04/ST02	07-ST02-P001	1	1	0.78	0.62			4.00	70.00
2.64	BS04/ST02	07-ST02-P002	1	2	0.76	0.61			4.00	70.00
2.65	BS04/ST02	07-ST02-P003	1	2	0.76	0.61			4.00	70.00
2.66	BS04/ST02	07-ST02-P004	1	2	0.46	0.37			2.00	70.00
2.67	BS04/ST02	07-ST02-P005	1	2	0.56	0.45			2.00	70.00
2.68	BS04/ST02	07-ST02-P006	1	2	0.51	0.41			2.00	70.00
2.69	BS04/ST02	07-ST02-P007	1	2	0.56	0.45			2.00	70.00
2.70	BS04/ST02	07-ST02-P008	1	2	0.51	0.41			2.00	70.00
2.71	BS04/ST02	07-ST02-S025	1	0						
2.72	BS04/ST02	07-ST02-S026	1	0						
2.73	BS04/ST02	07-ST02-S028	1	0						
2.74	BS04/ST03S	07-ST03S-P007	2	1	0.98	0.78				
2.75	BS04/ST03S	07-ST03S-P018	1	1	0.47	0.38			2.00	70.00
2.76	BS04/ST03S	07-ST03S-P020	1	1	0.47	0.37			2.00	70.00
2.77	BS04/ST03P	07-ST03P-P019	1	1	0.47	0.37			2.00	70.00
2.78	BS04/ST03P	07-ST03P-P021	2	1	0.98	0.78				
2.79	BS04/ST03P	07-ST03P-P022	1	1	0.47	0.38			2.00	70.00
2.80	GE/BS04	BS03	1	5						
2.81	GE/BS04	ST01P	1	4						
2.82	GE/BS04	ST01S	1	4						
2.83	GE/BS04	ST02	1	4						
2.84	GE/BS04	ST03P	1	3						
2.85	GE/BS04	ST03S	1	3						
2.86	GE/BS04	07-DK01-P015	1	1	0.65	0.52			2.00	70.00
2.87	GE/BS04	07-DK01-P019	1	1	0.65	0.52			2.00	70.00
2.88	GE/BS04	07-DK02-P004	1	1	0.65	0.52			2.00	70.00
2.89	GE/BS04	07-DK02-P007	1	1	0.65	0.52			2.00	70.00

ID No.	Assy Name	Part Name	Qty	PL_Weld_Time_Side_1 (min.)	PL_Weld_Time_Side_2 (min.)	Profile_Cut_Time (min.)	Profile_Mark_Time (min.)	EndCut_Time_Start_Time (min.)	EndCut_Time_Finish_Time (min.)	Profile_Handle_Time_to_Assy_Sta (min.)	Profile_Fit_Time (min.)
0.01	DK01+S/DK01	07-DK01-P002	1	21.89							
0.02	DK01+S/DK01	07-DK01-P009	1	10.68							
0.03	DK01+S/DK01	07-DK01-P023	1	0.00							
0.04	DK01+S/DK01SP	07-DK01-P039	1								
0.05	DK01+G/DK01+S	DK01	1								
0.06	DK01+G/DK01+S	DK01SP									
0.07	DK01+G/DK01+S	07-DK01-S001	2			4	1		10.00	16.00	24.00
0.08	DK01+G/DK01+S	07-DK01-S002	3			6	1.5		15.00	24.00	36.00
0.09	DK01+G/DK01+S	07-DK01-S003	1			2	0.5	5.00	5.00	4.00	5.00
0.10	DK01+G/DK01+S	07-DK01-S004	1			2	0.5	5.00	5.00	4.00	5.00
0.11	DK01+G/DK01+S	07-DK01-S007	1			2	0.5	5.00	5.00	8.00	12.00
0.12	DK01+G/DK01+S	07-DK01-S008	1			2	0.5	5.00	5.00	4.00	5.00
0.13	DK01+G/DK01+S	07-DK01-S009	1			2	0.5		5.00	4.00	5.00
0.14	DK01+G/DK01+S	07-DK01-S016	1			2	0.5	5.00	5.00	8.00	12.00
0.15	DK01+G/DK01+S	07-DK01-S036	1			2	0.5	5.00	5.00	4.00	5.00
0.16	DK01+G/DK01+S	07-DK01-S050	2			4	1			8.00	10.00
0.17	DK01+G/DK01+S	07-DK01-S051	1			2	0.5	5.00	5.00	4.00	5.00
0.18	DK01+G/DK01+S	07-DK01-S054	1			2	0.5	5.00	5.00	4.00	5.00
0.19	DK01+G/DK01+S	07-DK01-S055	1			2	0.5	5.00	5.00	4.00	5.00
0.20	DK01+G/DK01+S	07-DK01-S056	1			2	0.5	5.00	5.00	4.00	5.00
0.21	DK01+03/DK01+G	DK01+S	1								
0.22	DK01+03/DK01+G	07-DK01-F001	1			2	0.5			4.00	5.00
0.23	DK01+03/DK01+G	07-DK01-P003	1								
0.24	DK01+03/DK01+G	07-DK01-P004	1								
0.25	DK01+03/DK01+G	07-DK01-P005	1								
0.26	DK01+03/DK01+G	07-DK01-P008	1	2.62	2.62						
0.27	DK01+03/DK01+G	07-DK01-P012	1								
0.28	DK01+03/DK01+G	07-DK01-P014	1								
0.29	DK01+03/DK01+G	07-DK01-P016	1								
0.30	DK01+03/DK01+G	07-DK01-P017	1								
0.31	DK01+03/DK01+G	07-DK01-P018	1	4.31	4.31						
0.32	DK01+03/DK01+G	07-DK01-P020	1								
0.33	DK01+03/DK01+G	07-DK01-P022	1	4.15	4.15						
0.34	DK01+03/DK01+G	07-DK01-P030	1								
0.35	DK01+03/DK01+G	07-DK01-P033	1								
0.36	DK01+03/DK01+G	07-DK01-P036	1								
0.37	DK01+03/DK01+G	07-DK01-P061	1								
0.38	DK03+S/DK03	07-DK03-P015	1	4.14							
0.39	DK03+S/DK03	07-DK03-P021	1	0.00							
0.40	DK03+S/DK03SP	07-DK03-P001	1								
0.41	DK03+G/DK03+S	DK03	1								
0.42	DK03+G/DK03+S	DK03SP	0								

ID No.	Assy Name	Part Name	Qty	PL_Weld_Time_Side_1 (min.)	PL_Weld_Time_Side_2 (min.)	Profile_Cut_Time (min.)	Profile_Mark_Time (min.)	EndCut_Time_Start_Time (min.)	EndCut_Time_Finish_Time (min.)	Profile_Handle_Time_to_Assy_Sta (min.)	Profile_Fit_Time (min.)
0.43	DK03+G/DK03+S	07-DK03-S001	2			4	1	10.00		8.00	18.00
0.44	DK03+G/DK03+S	07-DK03-S003	3			6	1.5			12.00	27.00
0.45	DK03+G/DK03+S	07-DK03-S005	1			2	0.5			4.00	9.00
0.46	DK03+G/DK03+S	07-DK03-S006	1			2	0.5		5.00	4.00	5.00
0.47	DK03+G/DK03+S	07-DK03-S053	5			10	2.5			20.00	25.00
0.48	DK01+03/DK03+G	DK03+S	1								
0.49	DK01+03/DK03+G	07-DK03-P011	1								
0.50	DK01+03/DK03+G	07-DK03-P037	1								
0.51	DK01+03/DK03+G	07-DK03-P038	1								
0.52	BS01/DK01+03	DK01+G	1								
0.53	BS01/DK01+03	DK03+G	1								
0.54	DK02+S/DK02	07-DK02-P003	1	21.89							
0.55	DK02+S/DK02	07-DK02-P005	1	0.00							
0.56	DK02+S/DK02	07-DK02-P008	1	10.68							
0.57	DK02+S/DK02SP	07-DK02-P024	1								
0.58	DK02+G/DK02+S	DK02	1								
0.59	DK02+G/DK02+S	DK02SP	0								
0.60	DK02+G/DK02+S	07-DK02-S001	1			2	0.5	5.00		8.00	12.00
0.61	DK02+G/DK02+S	07-DK02-S002	1			2	0.5	5.00		8.00	12.00
0.62	DK02+G/DK02+S	07-DK02-S003	2			4	1	10.00		16.00	24.00
0.63	DK02+G/DK02+S	07-DK02-S004	1			2	0.5	5.00	5.00	4.00	5.00
0.64	DK02+G/DK02+S	07-DK02-S005	1			2	0.5	5.00	5.00	8.00	12.00
0.65	DK02+G/DK02+S	07-DK02-S006	1			2	0.5	5.00	5.00	4.00	5.00
0.66	DK02+G/DK02+S	07-DK02-S007	1			2	0.5	5.00	5.00	4.00	5.00
0.67	DK02+G/DK02+S	07-DK02-S008	1			2	0.5	5.00	5.00	8.00	12.00
0.68	DK02+G/DK02+S	07-DK02-S009	1			2	0.5	5.00		4.00	5.00
0.69	DK02+G/DK02+S	07-DK02-S020	1			2	0.5	5.00		8.00	12.00
0.70	DK02+G/DK02+S	07-DK02-S032	1			2	0.5	5.00		8.00	12.00
0.71	DK02+G/DK02+S	07-DK02-S050	2			4	1			8.00	10.00
0.72	DK02+G/DK02+S	07-DK02-S054	1			2	0.5	5.00	5.00	4.00	5.00
0.73	DK02+G/DK02+S	07-DK02-S055	1			2	0.5	5.00	5.00	4.00	5.00
0.74	DK02+G/DK02+S	07-DK02-S056	1			2	0.5	5.00	5.00	4.00	5.00
0.75	DK02+G/DK02+S	07-DK02-S061	1			2	0.5	5.00	5.00	4.00	5.00
0.76	DK02+G/DK02+S	07-DK02-S062	1			2	0.5	5.00	5.00	4.00	5.00
0.77	DK02+04/DK02+G	DK02+S	1								
0.78	DK02+04/DK02+G	07-DK02-F004	1			2	0.5			4.00	5.00
0.79	DK02+04/DK02+G	07-DK02-P009	1	4.15	4.15						
0.80	DK02+04/DK02+G	07-DK02-P010	1								
0.81	DK02+04/DK02+G	07-DK02-P011	1								
0.82	DK02+04/DK02+G	07-DK02-P014	1								
0.83	DK02+04/DK02+G	07-DK02-P015	1								
0.84	DK02+04/DK02+G	07-DK02-P016	1								

ID No.	Assy Name	Part Name	Qty	PL_Weld_Time_Side_1 (min.)	PL_Weld_Time_Side_2 (min.)	Profile_Cut_Time (min.)	Profile_Mark_Time (min.)	EndCut_Time_Start_Time (min.)	EndCut_Time_Finish_Time (min.)	Profile_Handle_Time_to_Assy_Sta (min.)	Profile_Fit_Time (min.)
0.85	DK02+04/DK02+G	07-DK02-P017	1								
0.86	DK02+04/DK02+G	07-DK02-P021	1								
0.87	DK02+04/DK02+G	07-DK02-P026	1								
0.88	DK02+04/DK02+G	07-DK02-P027	1								
0.89	DK02+04/DK02+G	07-DK02-P029	1								
0.90	DK02+04/DK02+G	07-DK02-P032	1								
0.91	DK02+04/DK02+G	07-DK02-P042	1								
0.92	DK02+04/DK02+G	07-DK02-P062	1	4.31	4.31						
0.93	DK02+04/DK02+G	07-LB02-P002	1	2.62	2.62						
0.94	DK04+S/DK04	07-DK04-P010	1	0.00							
0.95	DK04+S/DK04	07-DK04-P011	1	6.20							
0.96	DK04+S/DK04SP	07-DK04-P012	1								
0.97	DK04+G/DK04+S	DK04	1								
0.98	DK04+G/DK04+S	DK04SP	1								
0.99	DK04+G/DK04+S	07-DK04-S001	2			4	1			8.00	18.00
1.00	DK04+G/DK04+S	07-DK04-S002	1			2	0.5	5.00	5.00	4.00	5.00
1.01	DK04+G/DK04+S	07-DK04-S005	2			4	1			8.00	10.00
1.02	DK04+G/DK04+S	07-DK04-S006	1			2	0.5	5.00	5.00	4.00	9.00
1.03	DK04+G/DK04+S	07-DK04-S010	1			2	0.5		5.00	4.00	5.00
1.04	DK04+G/DK04+S	07-DK04-S013	4			8	2		20.00	16.00	36.00
1.05	DK04+G/DK04+S	07-DK04-S065	1			2	0.5		5.00	4.00	5.00
1.06	DK02+04/DK04+G	DK04+S	1								
1.07	DK02+04/DK04+G	07-DK04-P002	1								
1.08	DK02+04/DK04+G	07-DK04-P043	1								
1.09	DK02+04/DK04+G	07-DK04-P044	1								
1.10	DK02+04/DK04+G	07-DK04-P046	1								
1.11	BS01/DK02+04	DK02+G	1								
1.12	BS01/DK02+04	DK04+G	1								
1.13	BS02/BS01	DK01+03	1								
1.14	BS02/BS01	DK02+04	1								
1.15	BS02/BS01	07-DK01-P001	1								
1.16	BS02/BS01	07-DK01-P013	4	148.62	148.62						
1.17	BS02/BS01	07-DK01-P025	5								
1.18	BS02/BS01	07-DK01-P028	4	15.21	15.21						
1.19	BS02/BS01	07-DK02-P013	4	16.99	16.99						
1.20	BS02/BS01	07-DK02-P028	4	20.42	20.42						
1.21	BS02/BS01	07-DK03-P002	1								
1.22	BS02/BS01	07-DK03-P004	1								
1.23	BS02/BS01	07-DK03-P006	1	5.10	5.10						
1.24	BS02/BS01	07-DK03-P007	1	4.25	4.25						
1.25	BS02/BS01	07-DK03-P013	2	8.49	8.49						
1.26	BS02/BS01	07-DK03-P026	1	5.10	5.10						

ID No.	Assy Name	Part Name	Qty	PL_Weld_Time_Side_1 (min.)	PL_Weld_Time_Side_2 (min.)	Profile_Cut_Time (min.)	Profile_Mark_Time (min.)	EndCut_Time_Start_Time (min.)	EndCut_Time_Finish_Time (min.)	Profile_Handle_Time_to_Assy_Sta (min.)	Profile_Fit_Time (min.)
1.27	BS02/BS01	07-DK03-P027	1	4.25	4.25						
1.28	BS02/BS01	07-DK03-P028	2	10.21	10.21						
1.29	BS02/BS01	07-DK03-P045	1								
1.30	LB01+03/LB01	07-LB01-P002	1								
1.31	LB01+03/LB01	07-LB01-P003	1	0.00							
1.32	LB01+03/LB01	07-LB01-P004	1								
1.33	LB01+03/LB01	07-LB01-P005	1	5.13							
1.34	LB01+03/LB01	07-LB01-P006	1								
1.35	LB01+03/LB01	07-LB01-P007	1								
1.36	LB01+03/LB01	07-LB01-P008	1								
1.37	LB01+03/LB01	07-LB01-P010	1								
1.38	LB01+03/LB01	07-LB01-S001	2			4	1	10.00	10.00	8.00	10.00
1.39	LB01+03/LB01	07-LB01-S003	1			2	0.5	5.00		8.00	12.00
1.40	LB01+03/LB01	07-LB01-S004	1			2	0.5			4.00	5.00
1.41	LB01+03/LB01	07-LB01-S006	1			2	0.5		5.00	8.00	12.00
1.42	LB01+03/LB01	07-LB01-S007	1			2	0.5	5.00	5.00	4.00	5.00
1.43	LB01+03/LB01	07-LB01-S009	1			2	0.5		5.00	8.00	12.00
1.44	LB01+03/LB01	07-LB01-S010	3			6	1.5	15.00	15.00	12.00	15.00
1.45	LB01+03/LB01	07-LB01-S011	1			2	0.5			8.00	5.00
1.46	LB01+03/LB01	BKT092	3	14.83	7.42						
1.47	LB01+03/LB03	07-LB03-P005	1								
1.48	LB01+03/LB03	07-LB03-P009	1	12.03	12.03						
1.49	LB01+03/LB03	07-LB03-S008	1			2	0.5	5.00	5.00	8.00	5.00
1.50	LB01+03/LB03	07-LB03-S018	1			2	0.5		5.00	4.00	5.00
1.51	LB01+03/LB03	07-LB03-S019	2			4	1	10.00		8.00	10.00
1.52	LB01+03S/LB01+03	LB01	1								
1.53	LB01+03S/LB01+03	LB03	1								
1.54	VT01/LB05	07-LB05-P001	1	7.75	5.81						
1.55	VT01/LB05	07-LB05-P002	1	0.00							
1.56	VT01/LB05	07-LB05-S001	1			2	0.5			4.00	5.00
1.57	VT01/LB05	07-LB05-S002	1			2	0.5		5.00	4.00	5.00
1.58	VT01/TB41S	07-TB41S-P001	1	0.00							
1.59	VT01/TB41S	07-TB41S-S001	1			2	0.5		5.00	4.00	5.00
1.60	VT01/TB41S	07-TB41S-S002	1			2	0.5		5.00	4.00	5.00
1.61	VT01/TB41S	07-TB41S-S003	1			2	0.5			4.00	5.00
1.62	VT01/TB39S	07-TB39S-P001	1	0.00							
1.63	VT01/TB39S	07-TB39S-S002	1			2	0.5	5.00		4.00	5.00
1.64	VT01/TB39S	07-TB39S-S003	1			2	0.5	5.00		4.00	5.00
1.65	VT01/TB39S	07-TB39S-S004	1			2	0.5			4.00	5.00
1.66	LB01+03S/VT01	LB05	1								
1.67	LB01+03S/VT01	TB39S	1								
1.68	LB01+03S/VT01	TB41S	1								

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1.69	LB01+03S/DP01	07-DP01-P001	1	0.00							
1.70	LB01+03S/DP01	07-DP01-P002	1	9.40	9.40						
1.71	LB01+03S/DP01	07-DP01-P003	1	25.38	25.38						
1.72	LB01+03S/DP01	07-DP01-P004	1	25.38	25.38						
1.73	BS02/LB01+03S	DP01	1								
1.74	BS02/LB01+03S	LB01+03	1								
1.75	BS02/LB01+03S	VT01	1								
1.76	LB02+04/LB02	07-LB02-P001	1								
1.77	LB02+04/LB02	07-LB02-P007	1	5.13							
1.78	LB02+04/LB02	07-LB02-P009	5								
1.79	LB02+04/LB02	07-LB02-P011	1	0.00							
1.80	LB02+04/LB02	07-LB02-S001	1			2	0.5	5.00	5.00	4.00	5.00
1.81	LB02+04/LB02	07-LB02-S002	1			2	0.5	5.00	5.00	4.00	5.00
1.82	LB02+04/LB02	07-LB02-S004	1			2	0.5			4.00	5.00
1.83	LB02+04/LB02	07-LB02-S005	1			2	0.5	5.00		8.00	12.00
1.84	LB02+04/LB02	07-LB02-S006	1			2	0.5	5.00		8.00	12.00
1.85	LB02+04/LB02	07-LB02-S007	1			2	0.5		5.00	8.00	12.00
1.86	LB02+04/LB02	07-LB02-S008	1			2	0.5	5.00	5.00	4.00	5.00
1.87	LB02+04/LB02	07-LB02-S009	1			2	0.5			8.00	5.00
1.88	LB02+04/LB02	07-LB02-S010	3			6	1.5	15.00	15.00	12.00	15.00
1.89	LB02+04/LB02	BKT092	3	14.83	7.42						
1.90	LB02+04/LB04	07-LB04-P001	1								
1.91	LB02+04/LB04	07-LB04-P002	1	0.00							
1.92	LB02+04/LB04	07-LB04-S004	2			4	1		10.00	8.00	10.00
1.93	LB02+04/LB04	07-LB04-S008	1			2	0.5	5.00	5.00	8.00	5.00
1.94	LB02+04/LB04	07-LB04-S012	1			2	0.5	5.00		4.00	5.00
1.95	LB02+04P/LB02+04	LB02	1								
1.96	LB02+04P/LB02+04	LB04	1								
1.97	VT02/LB06	07-LB06-P001	1	0.00							
1.98	VT02/LB06	07-LB06-P002	1	7.75	5.81						
1.99	VT02/LB06	07-LB06-S001	1			2	0.5			4.00	5.00
2.00	VT02/LB06	07-LB06-S002	1			2	0.5	5.00		4.00	5.00
2.01	VT02/TB41P	07-TB41P-P001	1	0.00							
2.02	VT02/TB41P	07-TB41P-S001	1			2	0.5			4.00	5.00
2.03	VT02/TB41P	07-TB41P-S002	1			2	0.5	5.00		4.00	5.00
2.04	VT02/TB41P	07-TB41P-S003	1			2	0.5	5.00		4.00	5.00
2.05	VT02/TB39P	07-TB39P-P001	1	0.00							
2.06	VT02/TB39P	07-TB39P-S001	1			2	0.5			4.00	5.00
2.07	VT02/TB39P	07-TB39P-S002	1			2	0.5		5.00	4.00	5.00
2.08	VT02/TB39P	07-TB39P-S003	1			2	0.5		5.00	4.00	5.00
2.09	LB02+04P/VT02	LB06	1								
2.10	LB02+04P/VT02	TB39P	1								

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2.11	LB02+04P/VT02	TB41P	1								
2.12	LB02+04P/DP02	07-DP02-P001	1	0.00							
2.13	LB02+04P/DP02	07-DP02-P002	1	9.40	9.40						
2.14	LB02+04P/DP02	07-DP02-P003	1	25.38	25.38						
2.15	LB02+04P/DP02	07-DP02-P004	1	25.38	25.38						
2.16	BS02/LB02+04P	DP02	1								
2.17	BS02/LB02+04P	LB02+04	1								
2.18	BS02/LB02+04P	VT02	1								
2.19	BS02/TB63S	07-TB63S-P001	1	0.00							
2.20	BS02/TB63S	07-TB63S-S001	1			2	0.5			4.00	5.00
2.21	BS02/TB63S	07-TB63S-S002	1			2	0.5	5.00		4.00	5.00
2.22	BS02/TB63S	07-TB63S-S003	1			2	0.5	5.00		4.00	5.00
2.23	BS02/TB63S	07-TB63S-S004	2			4	1			8.00	10.00
2.24	BS02/TB63S	07-TB63S-S005	1			2	0.5			4.00	5.00
2.25	BS02/TB63S	07-TB63S-S006	1			2	0.5			4.00	5.00
2.26	BS02/TB63S	07-TB63S-S007	1			2	0.5			4.00	5.00
2.27	BS02/TB63S	07-TB63S-S008	1			2	0.5			4.00	5.00
2.28	BS02/TB63P	07-TB63P-P001	1	0.00							
2.29	BS02/TB63P	07-TB63P-S001	1			2	0.5			4.00	5.00
2.30	BS02/TB63P	07-TB63P-S002	1			2	0.5		5.00	4.00	5.00
2.31	BS02/TB63P	07-TB63P-S003	1			2	0.5		5.00	4.00	5.00
2.32	BS03/BS02	BS01	1								
2.33	BS03/BS02	LB01+03S	1								
2.34	BS03/BS02	LB02+04P	1								
2.35	BS03/BS02	TB63P	1								
2.36	BS03/BS02	TB63S	1								
2.37	BS03/BS02	07-DK03-P031	1	3.89	3.89						
2.38	BS03/SN01	07-SN01-S025	16			32	8			128.00	80.00
2.39	BS03/SN01	BKT096	32	86.70							
2.40	BS04/BS03	BS02	1								
2.41	BS04/BS03	SN01	1								
2.42	BS04/BS03	07-DK01-F002	1			2	0.5			4.00	5.00
2.43	BS04/BS03	07-DK01-F003	1			2	0.5			8.00	9.00
2.44	BS04/BS03	07-DK01-P007	1	5.52	5.52						
2.45	BS04/BS03	07-DK01-P010	1								
2.46	BS04/BS03	07-DK01-S063	1			2	0.5			4.00	9.00
2.47	BS04/BS03	07-DK02-F002	1			2	0.5			4.00	5.00
2.48	BS04/BS03	07-DK02-F003	1			2	0.5			8.00	9.00
2.49	BS04/BS03	07-DK02-P001	1	5.52	5.52						
2.50	BS04/BS03	07-DK02-P019	1								
2.51	BS04/BS03	07-DK02-S046	1			2	0.5			4.00	9.00
2.52	BS04/BS03	07-DK03-F002	1			2	0.5			8.00	12.00

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2.53	BS04/BS03	07-DK04-F001	1			2	0.5			8.00	12.00
2.54	BS04/BS03	07-LB01-S012	1			2	0.5			4.00	5.00
2.55	BS04/BS03	07-LB02-S023	1			2	0.5			4.00	5.00
2.56	BS04/BS03	BKT095	10	15.24	15.24						
2.57	BS04/ST01S	07-ST01S-P001	1	0.00							
2.58	BS04/ST01S	07-ST01S-P002	10								
2.59	BS04/ST01S	07-ST01S-S027	1			2	0.5	10.00	10.00	8.00	9.00
2.60	BS04/ST01P	07-ST01P-P001	1	0.00							
2.61	BS04/ST01P	07-ST01P-P002	10								
2.62	BS04/ST01P	07-ST01P-S029	1			2	0.5	10.00	10.00	8.00	9.00
2.63	BS04/ST02	07-ST02-P001	1	0.00							
2.64	BS04/ST02	07-ST02-P002	1	8.57	8.57						
2.65	BS04/ST02	07-ST02-P003	1	8.57	8.57						
2.66	BS04/ST02	07-ST02-P004	1	11.94	11.94						
2.67	BS04/ST02	07-ST02-P005	1	16.76	16.76						
2.68	BS04/ST02	07-ST02-P006	1	14.58	14.58						
2.69	BS04/ST02	07-ST02-P007	1	16.76	16.76						
2.70	BS04/ST02	07-ST02-P008	1	14.61	14.61						
2.71	BS04/ST02	07-ST02-S025	1			2	0.5			4.00	5.00
2.72	BS04/ST02	07-ST02-S026	1			2	0.5			4.00	5.00
2.73	BS04/ST02	07-ST02-S028	1			2	0.5			4.00	5.00
2.74	BS04/ST03S	07-ST03S-P007	2								
2.75	BS04/ST03S	07-ST03S-P018	1	0.00							
2.76	BS04/ST03S	07-ST03S-P020	1	0.00							
2.77	BS04/ST03P	07-ST03P-P019	1	0.00							
2.78	BS04/ST03P	07-ST03P-P021	2								
2.79	BS04/ST03P	07-ST03P-P022	1	0.00							
2.80	GE/BS04	BS03	1								
2.81	GE/BS04	ST01P	1								
2.82	GE/BS04	ST01S	1								
2.83	GE/BS04	ST02	1								
2.84	GE/BS04	ST03P	1								
2.85	GE/BS04	ST03S	1								
2.86	GE/BS04	07-DK01-P015	1	8.57							
2.87	GE/BS04	07-DK01-P019	1	9.84							
2.88	GE/BS04	07-DK02-P004	1	8.57							
2.89	GE/BS04	07-DK02-P007	1	9.84							

ID No.	Assy Name	Part Name	Qty	Profile_Weld_Time_Side_1 (min.)	Profile_Weld_Time_Side_2 (min.)	FP_Handle_Time_t o_Flanging_Sta (min.)	Flange_Time (min.)	FP_Handle_Time_to_Assembly_Sta (min.)	FP_Fit_Time (min.)	FP_Weld_Time_Side_1 (min.)
0.01	DK01+S/DK01	07-DK01-P002	1							
0.02	DK01+S/DK01	07-DK01-P009	1							
0.03	DK01+S/DK01	07-DK01-P023	1							
0.04	DK01+S/DK01SP	07-DK01-P039	1							
0.05	DK01+G/DK01+S	DK01	1							
0.06	DK01+G/DK01+S	DK01SP								
0.07	DK01+G/DK01+S	07-DK01-S001	2	61.19	61.19					
0.08	DK01+G/DK01+S	07-DK01-S002	3	106.30	106.30					
0.09	DK01+G/DK01+S	07-DK01-S003	1	3.69	3.69					
0.10	DK01+G/DK01+S	07-DK01-S004	1	3.69	3.69					
0.11	DK01+G/DK01+S	07-DK01-S007	1	28.82	28.82					
0.12	DK01+G/DK01+S	07-DK01-S008	1	5.55	5.55					
0.13	DK01+G/DK01+S	07-DK01-S009	1	2.88	2.88					
0.14	DK01+G/DK01+S	07-DK01-S016	1	28.82	28.82					
0.15	DK01+G/DK01+S	07-DK01-S036	1	1.11	1.11					
0.16	DK01+G/DK01+S	07-DK01-S050	2	7.08	7.08					
0.17	DK01+G/DK01+S	07-DK01-S051	1	1.11	1.11					
0.18	DK01+G/DK01+S	07-DK01-S054	1	9.11	9.11					
0.19	DK01+G/DK01+S	07-DK01-S055	1	9.08	9.08					
0.20	DK01+G/DK01+S	07-DK01-S056	1	8.00	8.00					
0.21	DK01+03/DK01+G	DK01+S	1							
0.22	DK01+03/DK01+G	07-DK01-F001	1	9.51	9.51					
0.23	DK01+03/DK01+G	07-DK01-P003	1			4.00	10.00	4.00	25.00	27.88
0.24	DK01+03/DK01+G	07-DK01-P004	1			4.00	10.00	4.00	25.00	28.10
0.25	DK01+03/DK01+G	07-DK01-P005	1			4.00	5.00	4.00	20.00	10.67
0.26	DK01+03/DK01+G	07-DK01-P008	1							
0.27	DK01+03/DK01+G	07-DK01-P012	1			2.00	2.00	2.00	15.00	5.67
0.28	DK01+03/DK01+G	07-DK01-P014	1			4.00	10.00	4.00	25.00	15.63
0.29	DK01+03/DK01+G	07-DK01-P016	1			2.00	2.00	2.00	15.00	4.26
0.30	DK01+03/DK01+G	07-DK01-P017	1			2.00	2.00	2.00	15.00	4.26
0.31	DK01+03/DK01+G	07-DK01-P018	1							
0.32	DK01+03/DK01+G	07-DK01-P020	1			4.00	10.00	4.00	25.00	15.82
0.33	DK01+03/DK01+G	07-DK01-P022	1							
0.34	DK01+03/DK01+G	07-DK01-P030	1			4.00	10.00	4.00	25.00	15.63
0.35	DK01+03/DK01+G	07-DK01-P033	1			4.00	10.00	4.00	25.00	15.63
0.36	DK01+03/DK01+G	07-DK01-P036	1			4.00	10.00	4.00	25.00	15.63
0.37	DK01+03/DK01+G	07-DK01-P061	1			4.00	10.00	4.00	25.00	21.72
0.38	DK03+S/DK03	07-DK03-P015	1							
0.39	DK03+S/DK03	07-DK03-P021	1							
0.40	DK03+S/DK03SP	07-DK03-P001	1							
0.41	DK03+G/DK03+S	DK03	1							
0.42	DK03+G/DK03+S	DK03SP	0							

ID No.	Assy Name	Part Name	Qty	Profile_Weld_Time_Side_1 (min.)	Profile_Weld_Time_Side_2 (min.)	FP_Handle_Time_to_Flanging_Station (min.)	Flange_Time (min.)	FP_Handle_Time_to_Assembly_Station (min.)	FP_Fit_Time (min.)	FP_Weld_Time_Side_1 (min.)
0.43	DK03+G/DK03+S	07-DK03-S001	2	20.20	20.20					
0.44	DK03+G/DK03+S	07-DK03-S003	3	29.59	29.59					
0.45	DK03+G/DK03+S	07-DK03-S005	1	9.86	9.86					
0.46	DK03+G/DK03+S	07-DK03-S006	1	8.98	8.98					
0.47	DK03+G/DK03+S	07-DK03-S053	5	2.31	2.31					
0.48	DK01+03/DK03+G	DK03+S	1							
0.49	DK01+03/DK03+G	07-DK03-P011	1			4.00	10.00	4.00	25.00	18.59
0.50	DK01+03/DK03+G	07-DK03-P037	1			4.00	10.00	4.00	25.00	15.63
0.51	DK01+03/DK03+G	07-DK03-P038	1			4.00	10.00	4.00	25.00	15.63
0.52	BS01/DK01+03	DK01+G	1							
0.53	BS01/DK01+03	DK03+G	1							
0.54	DK02+S/DK02	07-DK02-P003	1							
0.55	DK02+S/DK02	07-DK02-P005	1							
0.56	DK02+S/DK02	07-DK02-P008	1							
0.57	DK02+S/DK02SP	07-DK02-P024	1							
0.58	DK02+G/DK02+S	DK02	1							
0.59	DK02+G/DK02+S	DK02SP	0							
0.60	DK02+G/DK02+S	07-DK02-S001	1	35.43	35.43					
0.61	DK02+G/DK02+S	07-DK02-S002	1	35.43	35.43					
0.62	DK02+G/DK02+S	07-DK02-S003	2	61.19	61.19					
0.63	DK02+G/DK02+S	07-DK02-S004	1	5.55	5.55					
0.64	DK02+G/DK02+S	07-DK02-S005	1	28.82	28.82					
0.65	DK02+G/DK02+S	07-DK02-S006	1	3.69	3.69					
0.66	DK02+G/DK02+S	07-DK02-S007	1	3.69	3.69					
0.67	DK02+G/DK02+S	07-DK02-S008	1	28.82	28.82					
0.68	DK02+G/DK02+S	07-DK02-S009	1	2.88	2.88					
0.69	DK02+G/DK02+S	07-DK02-S020	1	35.43	35.43					
0.70	DK02+G/DK02+S	07-DK02-S032	1	30.59	30.59					
0.71	DK02+G/DK02+S	07-DK02-S050	2	7.08	7.08					
0.72	DK02+G/DK02+S	07-DK02-S054	1	5.52	5.52					
0.73	DK02+G/DK02+S	07-DK02-S055	1	5.50	5.50					
0.74	DK02+G/DK02+S	07-DK02-S056	1	4.85	4.85					
0.75	DK02+G/DK02+S	07-DK02-S061	1	1.11	1.11					
0.76	DK02+G/DK02+S	07-DK02-S062	1	1.11	1.11					
0.77	DK02+04/DK02+G	DK02+S	1							
0.78	DK02+04/DK02+G	07-DK02-F004	1	9.76	9.76					
0.79	DK02+04/DK02+G	07-DK02-P009	1							
0.80	DK02+04/DK02+G	07-DK02-P010	1			4.00	10.00	4.00	25.00	27.88
0.81	DK02+04/DK02+G	07-DK02-P011	1			4.00	10.00	4.00	25.00	28.10
0.82	DK02+04/DK02+G	07-DK02-P014	1			2.00	2.00	2.00	15.00	4.26
0.83	DK02+04/DK02+G	07-DK02-P015	1			4.00	10.00	4.00	25.00	21.72
0.84	DK02+04/DK02+G	07-DK02-P016	1			2.00	2.00	2.00	15.00	4.26

ID No.	Assy Name	Part Name	Qty	Profile_Weld_Time_Side_1 (min.)	Profile_Weld_Time_Side_2 (min.)	FP_Handle_Time_t o_Flanging_Sta (min.)	Flange_Time (min.)	FP_Handle_Time_to_Assembly_Sta (min.)	FP_Fit_Time (min.)	FP_Weld_Time_Side_1 (min.)
0.85	DK02+04/DK02+G	07-DK02-P017	1			2.00	2.00	2.00	15.00	4.26
0.86	DK02+04/DK02+G	07-DK02-P021	1			4.00	10.00	4.00	25.00	15.82
0.87	DK02+04/DK02+G	07-DK02-P026	1			4.00	5.00	4.00	20.00	10.67
0.88	DK02+04/DK02+G	07-DK02-P027	1			4.00	10.00	4.00	25.00	15.63
0.89	DK02+04/DK02+G	07-DK02-P029	1			4.00	10.00	4.00	25.00	15.63
0.90	DK02+04/DK02+G	07-DK02-P032	1			4.00	10.00	4.00	25.00	15.63
0.91	DK02+04/DK02+G	07-DK02-P042	1			4.00	10.00	4.00	25.00	15.63
0.92	DK02+04/DK02+G	07-DK02-P062	1							
0.93	DK02+04/DK02+G	07-LB02-P002	1							
0.94	DK04+S/DK04	07-DK04-P010	1							
0.95	DK04+S/DK04	07-DK04-P011	1							
0.96	DK04+S/DK04SP	07-DK04-P012	1							
0.97	DK04+G/DK04+S	DK04	1							
0.98	DK04+G/DK04+S	DK04SP	1							
0.99	DK04+G/DK04+S	07-DK04-S001	2	19.73	19.73					
1.00	DK04+G/DK04+S	07-DK04-S002	1	1.84	1.84					
1.01	DK04+G/DK04+S	07-DK04-S005	2	0.92	0.92					
1.02	DK04+G/DK04+S	07-DK04-S006	1	9.29	9.29					
1.03	DK04+G/DK04+S	07-DK04-S010	1	8.25	8.25					
1.04	DK04+G/DK04+S	07-DK04-S013	4	40.41	40.41					
1.05	DK04+G/DK04+S	07-DK04-S065	1	3.67	3.67					
1.06	DK02+04/DK04+G	DK04+S	1							
1.07	DK02+04/DK04+G	07-DK04-P002	1			4.00	10.00	4.00	25.00	18.75
1.08	DK02+04/DK04+G	07-DK04-P043	1			4.00	10.00	4.00	25.00	15.63
1.09	DK02+04/DK04+G	07-DK04-P044	1			4.00	10.00	4.00	25.00	15.63
1.10	DK02+04/DK04+G	07-DK04-P046	1			4.00	5.00	4.00	20.00	9.81
1.11	BS01/DK02+04	DK02+G	1							
1.12	BS01/DK02+04	DK04+G	1							
1.13	BS02/BS01	DK01+03	1							
1.14	BS02/BS01	DK02+04	1							
1.15	BS02/BS01	07-DK01-P001	1			4.00	10.00	4.00	25.00	18.58
1.16	BS02/BS01	07-DK01-P013	4							
1.17	BS02/BS01	07-DK01-P025	5			20.00	50.00	20.00	125.00	10.62
1.18	BS02/BS01	07-DK01-P028	4							
1.19	BS02/BS01	07-DK02-P013	4							
1.20	BS02/BS01	07-DK02-P028	4							
1.21	BS02/BS01	07-DK03-P002	1			4.00	10.00	4.00	25.00	18.13
1.22	BS02/BS01	07-DK03-P004	1			4.00	10.00	4.00	25.00	18.13
1.23	BS02/BS01	07-DK03-P006	1							
1.24	BS02/BS01	07-DK03-P007	1							
1.25	BS02/BS01	07-DK03-P013	2							
1.26	BS02/BS01	07-DK03-P026	1							

ID No.	Assy Name	Part Name	Qty	Profile_Weld_Time_Side_1 (min.)	Profile_Weld_Time_Side_2 (min.)	FP_Handle_Time_to_Flanging_Sta (min.)	Flange_Time (min.)	FP_Handle_Time_to_Assembly_Sta (min.)	FP_Fit_Time (min.)	FP_Weld_Time_Side_1 (min.)
1.27	BS02/BS01	07-DK03-P027	1							
1.28	BS02/BS01	07-DK03-P028	2							
1.29	BS02/BS01	07-DK03-P045	1			4.00	10.00	4.00	25.00	17.86
1.30	LB01+03/LB01	07-LB01-P002	1			4.00	2.00	4.00	15.00	5.49
1.31	LB01+03/LB01	07-LB01-P003	1							
1.32	LB01+03/LB01	07-LB01-P004	1			4.00	5.00	4.00	20.00	11.84
1.33	LB01+03/LB01	07-LB01-P005	1							
1.34	LB01+03/LB01	07-LB01-P006	1			4.00	5.00	4.00	20.00	11.84
1.35	LB01+03/LB01	07-LB01-P007	1			4.00	5.00	4.00	20.00	11.84
1.36	LB01+03/LB01	07-LB01-P008	1			4.00	5.00	4.00	20.00	11.84
1.37	LB01+03/LB01	07-LB01-P010	1			4.00	5.00	4.00	20.00	11.84
1.38	LB01+03/LB01	07-LB01-S001	2	2.22	2.22					
1.39	LB01+03/LB01	07-LB01-S003	1	52.78	52.78					
1.40	LB01+03/LB01	07-LB01-S004	1	5.84	5.84					
1.41	LB01+03/LB01	07-LB01-S006	1	43.67	43.67					
1.42	LB01+03/LB01	07-LB01-S007	1	1.11	1.11					
1.43	LB01+03/LB01	07-LB01-S009	1	43.67	43.67					
1.44	LB01+03/LB01	07-LB01-S010	3	10.29	10.29					
1.45	LB01+03/LB01	07-LB01-S011	1	25.66	12.83					
1.46	LB01+03/LB01	BKT092	3							
1.47	LB01+03/LB03	07-LB03-P005	1			4.00	5.00	4.00	20.00	
1.48	LB01+03/LB03	07-LB03-P009	1							
1.49	LB01+03/LB03	07-LB03-S008	1	5.52	5.52					
1.50	LB01+03/LB03	07-LB03-S018	1	5.03	5.03					
1.51	LB01+03/LB03	07-LB03-S019	2	10.06	10.06					
1.52	LB01+03S/LB01+03	LB01	1							
1.53	LB01+03S/LB01+03	LB03	1							
1.54	VT01/LB05	07-LB05-P001	1							
1.55	VT01/LB05	07-LB05-P002	1							
1.56	VT01/LB05	07-LB05-S001	1	3.52	3.52					
1.57	VT01/LB05	07-LB05-S002	1	7.01	7.01					
1.58	VT01/TB41S	07-TB41S-P001	1							
1.59	VT01/TB41S	07-TB41S-S001	1	6.87	6.87					
1.60	VT01/TB41S	07-TB41S-S002	1	6.83	6.83					
1.61	VT01/TB41S	07-TB41S-S003	1	3.04	3.04					
1.62	VT01/TB39S	07-TB39S-P001	1							
1.63	VT01/TB39S	07-TB39S-S002	1	6.87	6.87					
1.64	VT01/TB39S	07-TB39S-S003	1	6.83	6.83					
1.65	VT01/TB39S	07-TB39S-S004	1	3.04	3.04					
1.66	LB01+03S/VT01	LB05	1							
1.67	LB01+03S/VT01	TB39S	1							
1.68	LB01+03S/VT01	TB41S	1							

ID No.	Assy Name	Part Name	Qty	Profile_Weld_Time_Side_1 (min.)	Profile_Weld_Time_Side_2 (min.)	FP_Handle_Time_to_Flanging_Station (min.)	Flange_Time (min.)	FP_Handle_Time_to_Assembly_Station (min.)	FP_Fit_Time (min.)	FP_Weld_Time_Side_1 (min.)
1.69	LB01+03S/DP01	07-DP01-P001	1							
1.70	LB01+03S/DP01	07-DP01-P002	1							
1.71	LB01+03S/DP01	07-DP01-P003	1							
1.72	LB01+03S/DP01	07-DP01-P004	1							
1.73	BS02/LB01+03S	DP01	1							
1.74	BS02/LB01+03S	LB01+03	1							
1.75	BS02/LB01+03S	VT01	1							
1.76	LB02+04/LB02	07-LB02-P001	1			4.00	2.00	4.00	15.00	5.49
1.77	LB02+04/LB02	07-LB02-P007	1							
1.78	LB02+04/LB02	07-LB02-P009	5			20.00	25.00	20.00	100.00	59.21
1.79	LB02+04/LB02	07-LB02-P011	1							
1.80	LB02+04/LB02	07-LB02-S001	1	1.11	1.11					
1.81	LB02+04/LB02	07-LB02-S002	1	1.11	1.11					
1.82	LB02+04/LB02	07-LB02-S004	1	5.84	5.84					
1.83	LB02+04/LB02	07-LB02-S005	1	43.67	43.67					
1.84	LB02+04/LB02	07-LB02-S006	1	43.67	43.67					
1.85	LB02+04/LB02	07-LB02-S007	1	52.78	52.78					
1.86	LB02+04/LB02	07-LB02-S008	1	1.11	1.11					
1.87	LB02+04/LB02	07-LB02-S009	1	25.66	12.83					
1.88	LB02+04/LB02	07-LB02-S010	3	10.29	10.29					
1.89	LB02+04/LB02	BKT092	3							
1.90	LB02+04/LB04	07-LB04-P001	1			4.00	5.00	4.00	20.00	11.84
1.91	LB02+04/LB04	07-LB04-P002	1							
1.92	LB02+04/LB04	07-LB04-S004	2	10.06	10.06					
1.93	LB02+04/LB04	07-LB04-S008	1	5.52	5.52					
1.94	LB02+04/LB04	07-LB04-S012	1	5.03	5.03					
1.95	LB02+04P/LB02+04	LB02	1							
1.96	LB02+04P/LB02+04	LB04	1							
1.97	VT02/LB06	07-LB06-P001	1							
1.98	VT02/LB06	07-LB06-P002	1							
1.99	VT02/LB06	07-LB06-S001	1	3.52	3.52					
2.00	VT02/LB06	07-LB06-S002	1	7.01	7.01					
2.01	VT02/TB41P	07-TB41P-P001	1							
2.02	VT02/TB41P	07-TB41P-S001	1	3.04	3.04					
2.03	VT02/TB41P	07-TB41P-S002	1	6.83	6.83					
2.04	VT02/TB41P	07-TB41P-S003	1	6.87	6.87					
2.05	VT02/TB39P	07-TB39P-P001	1							
2.06	VT02/TB39P	07-TB39P-S001	1	3.04	3.04					
2.07	VT02/TB39P	07-TB39P-S002	1	6.83	6.83					
2.08	VT02/TB39P	07-TB39P-S003	1	6.87	6.87					
2.09	LB02+04P/VT02	LB06	1							
2.10	LB02+04P/VT02	TB39P	1							

ID No.	Assy Name	Part Name	Qty	Profile_Weld_Time_Side_1 (min.)	Profile_Weld_Time_Side_2 (min.)	FP_Handle_Time_t o_Flanging_Sta (min.)	Flange_Time (min.)	FP_Handle_Time_to_Assembly_Sta (min.)	FP_Fit_Time (min.)	FP_Weld_Time_Side_1 (min.)
2.11	LB02+04P/VT02	TB41P	1							
2.12	LB02+04P/DP02	07-DP02-P001	1							
2.13	LB02+04P/DP02	07-DP02-P002	1							
2.14	LB02+04P/DP02	07-DP02-P003	1							
2.15	LB02+04P/DP02	07-DP02-P004	1							
2.16	BS02/LB02+04P	DP02	1							
2.17	BS02/LB02+04P	LB02+04	1							
2.18	BS02/LB02+04P	VT02	1							
2.19	BS02/TB63S	07-TB63S-P001	1							
2.20	BS02/TB63S	07-TB63S-S001	1	5.81	5.81					
2.21	BS02/TB63S	07-TB63S-S002	1	4.20	4.20					
2.22	BS02/TB63S	07-TB63S-S003	1	4.22	4.22					
2.23	BS02/TB63S	07-TB63S-S004	2	7.39	7.39					
2.24	BS02/TB63S	07-TB63S-S005	1	3.53	3.53					
2.25	BS02/TB63S	07-TB63S-S006	1	3.57	3.57					
2.26	BS02/TB63S	07-TB63S-S007	1	3.69	3.69					
2.27	BS02/TB63S	07-TB63S-S008	1	3.60	3.60					
2.28	BS02/TB63P	07-TB63P-P001	1							
2.29	BS02/TB63P	07-TB63P-S001	1	5.81	5.81					
2.30	BS02/TB63P	07-TB63P-S002	1	4.22	4.22					
2.31	BS02/TB63P	07-TB63P-S003	1	4.20	4.20					
2.32	BS03/BS02	BS01	1							
2.33	BS03/BS02	LB01+03S	1							
2.34	BS03/BS02	LB02+04P	1							
2.35	BS03/BS02	TB63P	1							
2.36	BS03/BS02	TB63S	1							
2.37	BS03/BS02	07-DK03-P031	1							
2.38	BS03/SN01	07-SN01-S025	16							
2.39	BS03/SN01	BKT096	32							
2.40	BS04/BS03	BS02	1							
2.41	BS04/BS03	SN01	1							
2.42	BS04/BS03	07-DK01-F002	1	12.32	12.32					
2.43	BS04/BS03	07-DK01-F003	1	25.97	25.97					
2.44	BS04/BS03	07-DK01-P007	1							
2.45	BS04/BS03	07-DK01-P010	1			2.00	2.00	2.00	15.00	5.52
2.46	BS04/BS03	07-DK01-S063	1	22.06	22.06					
2.47	BS04/BS03	07-DK02-F002	1	12.32	12.32					
2.48	BS04/BS03	07-DK02-F003	1	25.97	25.97					
2.49	BS04/BS03	07-DK02-P001	1							
2.50	BS04/BS03	07-DK02-P019	1			2.00	2.00	2.00	15.00	5.52
2.51	BS04/BS03	07-DK02-S046	1	22.06	22.06					
2.52	BS04/BS03	07-DK03-F002	1	35.78	35.78					

ID No.	Assy Name	Part Name	Qty	Profile_Weld_Time_Side_1 (min.)	Profile_Weld_Time_Side_2 (min.)	FP_Handle_Time_t o_Flanging_Sta (min.)	Flange_Time (min.)	FP_Handle_Time_to_Assembly_Sta (min.)	FP_Fit_Time (min.)	FP_Weld_Time_Side_1 (min.)
2.53	BS04/BS03	07-DK04-F001	1	35.78	35.78					
2.54	BS04/BS03	07-LB01-S012	1	12.89	12.89					
2.55	BS04/BS03	07-LB02-S023	1	12.89	12.89					
2.56	BS04/BS03	BKT095	10							
2.57	BS04/ST01S	07-ST01S-P001	1							
2.58	BS04/ST01S	07-ST01S-P002	10			20.00	20.00	20.00	150.00	53.34
2.59	BS04/ST01S	07-ST01S-S027	1							
2.60	BS04/ST01P	07-ST01P-P001	1							
2.61	BS04/ST01P	07-ST01P-P002	10			20.00	20.00	20.00	150.00	53.34
2.62	BS04/ST01P	07-ST01P-S029	1							
2.63	BS04/ST02	07-ST02-P001	1							
2.64	BS04/ST02	07-ST02-P002	1							
2.65	BS04/ST02	07-ST02-P003	1							
2.66	BS04/ST02	07-ST02-P004	1							
2.67	BS04/ST02	07-ST02-P005	1							
2.68	BS04/ST02	07-ST02-P006	1							
2.69	BS04/ST02	07-ST02-P007	1							
2.70	BS04/ST02	07-ST02-P008	1							
2.71	BS04/ST02	07-ST02-S025	1	4.57						
2.72	BS04/ST02	07-ST02-S026	1	4.57						
2.73	BS04/ST02	07-ST02-S028	1	11.02						
2.74	BS04/ST03S	07-ST03S-P007	2			4.00	4.00	4.00	30.00	10.67
2.75	BS04/ST03S	07-ST03S-P018	1							
2.76	BS04/ST03S	07-ST03S-P020	1							
2.77	BS04/ST03P	07-ST03P-P019	1							
2.78	BS04/ST03P	07-ST03P-P021	2			4.00	4.00	4.00	30.00	10.67
2.79	BS04/ST03P	07-ST03P-P022	1							
2.80	GE/BS04	BS03	1							
2.81	GE/BS04	ST01P	1							
2.82	GE/BS04	ST01S	1							
2.83	GE/BS04	ST02	1							
2.84	GE/BS04	ST03P	1							
2.85	GE/BS04	ST03S	1							
2.86	GE/BS04	07-DK01-P015	1							
2.87	GE/BS04	07-DK01-P019	1							
2.88	GE/BS04	07-DK02-P004	1							
2.89	GE/BS04	07-DK02-P007	1							

ID No.	Assy Name	Part Name	Qty	FP_Weld_Time_Side_2 (min.)	Panel_Handle_Time_to_Assembly_Sta (min.)	Panel_Fitup_Time (min.)	Panel_Weld_Time_Side_1 (min.)	Panel_Weld_Time_Side_2 (min.)	PL_Handle_Time_from_Bevel_Sta_to_Flanging_Sta (min.)
0.01	DK01+S/DK01	07-DK01-P002	1						
0.02	DK01+S/DK01	07-DK01-P009	1						
0.03	DK01+S/DK01	07-DK01-P023	1						
0.04	DK01+S/DK01SP	07-DK01-P039	1						
0.05	DK01+G/DK01+S	DK01	1		10.00	240.00			
0.06	DK01+G/DK01+S	DK01SP							
0.07	DK01+G/DK01+S	07-DK01-S001	2						
0.08	DK01+G/DK01+S	07-DK01-S002	3						
0.09	DK01+G/DK01+S	07-DK01-S003	1						
0.10	DK01+G/DK01+S	07-DK01-S004	1						
0.11	DK01+G/DK01+S	07-DK01-S007	1						
0.12	DK01+G/DK01+S	07-DK01-S008	1						
0.13	DK01+G/DK01+S	07-DK01-S009	1						
0.14	DK01+G/DK01+S	07-DK01-S016	1						
0.15	DK01+G/DK01+S	07-DK01-S036	1						
0.16	DK01+G/DK01+S	07-DK01-S050	2						
0.17	DK01+G/DK01+S	07-DK01-S051	1						
0.18	DK01+G/DK01+S	07-DK01-S054	1						
0.19	DK01+G/DK01+S	07-DK01-S055	1						
0.20	DK01+G/DK01+S	07-DK01-S056	1						
0.21	DK01+03/DK01+G	DK01+S	1		10.00	300.00			
0.22	DK01+03/DK01+G	07-DK01-F001	1						
0.23	DK01+03/DK01+G	07-DK01-P003	1	27.88					
0.24	DK01+03/DK01+G	07-DK01-P004	1	28.10					
0.25	DK01+03/DK01+G	07-DK01-P005	1	10.67					
0.26	DK01+03/DK01+G	07-DK01-P008	1						
0.27	DK01+03/DK01+G	07-DK01-P012	1	5.67					
0.28	DK01+03/DK01+G	07-DK01-P014	1	15.63					
0.29	DK01+03/DK01+G	07-DK01-P016	1	4.26					
0.30	DK01+03/DK01+G	07-DK01-P017	1	4.26					
0.31	DK01+03/DK01+G	07-DK01-P018	1						
0.32	DK01+03/DK01+G	07-DK01-P020	1	15.82					
0.33	DK01+03/DK01+G	07-DK01-P022	1						
0.34	DK01+03/DK01+G	07-DK01-P030	1	15.63					
0.35	DK01+03/DK01+G	07-DK01-P033	1	15.63					
0.36	DK01+03/DK01+G	07-DK01-P036	1	15.63					
0.37	DK01+03/DK01+G	07-DK01-P061	1	21.72					
0.38	DK03+S/DK03	07-DK03-P015	1						
0.39	DK03+S/DK03	07-DK03-P021	1						
0.40	DK03+S/DK03SP	07-DK03-P001	1						
0.41	DK03+G/DK03+S	DK03	1		10.00	240.00			
0.42	DK03+G/DK03+S	DK03SP	0		0.00				

ID No.	Assy Name	Part Name	Qty	FP_Weld_Time_Side_2 (min.)	Panel_Handle_Time_to_Assembly_Sta (min.)	Panel_Fitup_Time (min.)	Panel_Weld_Time_Side_1 (min.)	Panel_Weld_Time_Side_2 (min.)	PL_Handle_Time_from_Bevel_Sta_to_Flanging_Sta (min.)
0.43	DK03+G/DK03+S	07-DK03-S001	2						
0.44	DK03+G/DK03+S	07-DK03-S003	3						
0.45	DK03+G/DK03+S	07-DK03-S005	1						
0.46	DK03+G/DK03+S	07-DK03-S006	1						
0.47	DK03+G/DK03+S	07-DK03-S053	5						
0.48	DK01+03/DK03+G	DK03+S	1		10.00	240.00			
0.49	DK01+03/DK03+G	07-DK03-P011	1	18.59					
0.50	DK01+03/DK03+G	07-DK03-P037	1	15.63					
0.51	DK01+03/DK03+G	07-DK03-P038	1	15.63					
0.52	BS01/DK01+03	DK01+G	1		10.00	300.00			
0.53	BS01/DK01+03	DK03+G	1		10.00	240.00	7.42		
0.54	DK02+S/DK02	07-DK02-P003	1						
0.55	DK02+S/DK02	07-DK02-P005	1						
0.56	DK02+S/DK02	07-DK02-P008	1						
0.57	DK02+S/DK02SP	07-DK02-P024	1						
0.58	DK02+G/DK02+S	DK02	1		10.00	240.00			
0.59	DK02+G/DK02+S	DK02SP	0		0.00				
0.60	DK02+G/DK02+S	07-DK02-S001	1						
0.61	DK02+G/DK02+S	07-DK02-S002	1						
0.62	DK02+G/DK02+S	07-DK02-S003	2						
0.63	DK02+G/DK02+S	07-DK02-S004	1						
0.64	DK02+G/DK02+S	07-DK02-S005	1						
0.65	DK02+G/DK02+S	07-DK02-S006	1						
0.66	DK02+G/DK02+S	07-DK02-S007	1						
0.67	DK02+G/DK02+S	07-DK02-S008	1						
0.68	DK02+G/DK02+S	07-DK02-S009	1						
0.69	DK02+G/DK02+S	07-DK02-S020	1						
0.70	DK02+G/DK02+S	07-DK02-S032	1						
0.71	DK02+G/DK02+S	07-DK02-S050	2						
0.72	DK02+G/DK02+S	07-DK02-S054	1						
0.73	DK02+G/DK02+S	07-DK02-S055	1						
0.74	DK02+G/DK02+S	07-DK02-S056	1						
0.75	DK02+G/DK02+S	07-DK02-S061	1						
0.76	DK02+G/DK02+S	07-DK02-S062	1						
0.77	DK02+04/DK02+G	DK02+S	1		10.00	300.00			
0.78	DK02+04/DK02+G	07-DK02-F004	1						
0.79	DK02+04/DK02+G	07-DK02-P009	1						
0.80	DK02+04/DK02+G	07-DK02-P010	1	27.88					
0.81	DK02+04/DK02+G	07-DK02-P011	1	28.10					
0.82	DK02+04/DK02+G	07-DK02-P014	1	4.26					
0.83	DK02+04/DK02+G	07-DK02-P015	1	21.72					
0.84	DK02+04/DK02+G	07-DK02-P016	1	4.26					

ID No.	Assy Name	Part Name	Qty	FP_Weld_Time_Side_2 (min.)	Panel_Handle_Time_to_Assembly_Sta (min.)	Panel_Fitup_Time (min.)	Panel_Weld_Time_Side_1 (min.)	Panel_Weld_Time_Side_2 (min.)	PL_Handle_Time_from_Bevel_Sta_to_Flanging_Sta (min.)
0.85	DK02+04/DK02+G	07-DK02-P017	1	4.26					
0.86	DK02+04/DK02+G	07-DK02-P021	1	15.82					
0.87	DK02+04/DK02+G	07-DK02-P026	1	10.67					
0.88	DK02+04/DK02+G	07-DK02-P027	1	15.63					
0.89	DK02+04/DK02+G	07-DK02-P029	1	15.63					
0.90	DK02+04/DK02+G	07-DK02-P032	1	15.63					
0.91	DK02+04/DK02+G	07-DK02-P042	1	15.63					
0.92	DK02+04/DK02+G	07-DK02-P062	1						
0.93	DK02+04/DK02+G	07-LB02-P002	1						
0.94	DK04+S/DK04	07-DK04-P010	1						
0.95	DK04+S/DK04	07-DK04-P011	1						
0.96	DK04+S/DK04SP	07-DK04-P012	1						
0.97	DK04+G/DK04+S	DK04	1		10.00	240.00			
0.98	DK04+G/DK04+S	DK04SP	1		10.00				
0.99	DK04+G/DK04+S	07-DK04-S001	2						
1.00	DK04+G/DK04+S	07-DK04-S002	1						
1.01	DK04+G/DK04+S	07-DK04-S005	2						
1.02	DK04+G/DK04+S	07-DK04-S006	1						
1.03	DK04+G/DK04+S	07-DK04-S010	1						
1.04	DK04+G/DK04+S	07-DK04-S013	4						
1.05	DK04+G/DK04+S	07-DK04-S065	1						
1.06	DK02+04/DK04+G	DK04+S	1		10.00	240.00			
1.07	DK02+04/DK04+G	07-DK04-P002	1	18.75					
1.08	DK02+04/DK04+G	07-DK04-P043	1	15.63					
1.09	DK02+04/DK04+G	07-DK04-P044	1	15.63					
1.10	DK02+04/DK04+G	07-DK04-P046	1	9.81					
1.11	BS01/DK02+04	DK02+G	1		10.00	300.00			
1.12	BS01/DK02+04	DK04+G	1		10.00	240.00	7.42		
1.13	BS02/BS01	DK01+03	1		10.00	300.00			
1.14	BS02/BS01	DK02+04	1		10.00	300.00	27.36		
1.15	BS02/BS01	07-DK01-P001	1	18.58					
1.16	BS02/BS01	07-DK01-P013	4						
1.17	BS02/BS01	07-DK01-P025	5	10.62					
1.18	BS02/BS01	07-DK01-P028	4						
1.19	BS02/BS01	07-DK02-P013	4						
1.20	BS02/BS01	07-DK02-P028	4						
1.21	BS02/BS01	07-DK03-P002	1	18.13					
1.22	BS02/BS01	07-DK03-P004	1	18.13					
1.23	BS02/BS01	07-DK03-P006	1						
1.24	BS02/BS01	07-DK03-P007	1						
1.25	BS02/BS01	07-DK03-P013	2						
1.26	BS02/BS01	07-DK03-P026	1						

ID No.	Assy Name	Part Name	Qty	FP_Weld_Time_Side_2 (min.)	Panel_Handle_Time_to_Assembly_Sta (min.)	Panel_Fitup_Time (min.)	Panel_Weld_Time_Side_1 (min.)	Panel_Weld_Time_Side_2 (min.)	PL_Handle_Time_from_Bevel_Sta_to_Flanging_Sta (min.)
1.27	BS02/BS01	07-DK03-P027	1						
1.28	BS02/BS01	07-DK03-P028	2						
1.29	BS02/BS01	07-DK03-P045	1	17.86					
1.30	LB01+03/LB01	07-LB01-P002	1	5.49					
1.31	LB01+03/LB01	07-LB01-P003	1						
1.32	LB01+03/LB01	07-LB01-P004	1	11.84					
1.33	LB01+03/LB01	07-LB01-P005	1						
1.34	LB01+03/LB01	07-LB01-P006	1	11.84					
1.35	LB01+03/LB01	07-LB01-P007	1	11.84					
1.36	LB01+03/LB01	07-LB01-P008	1	11.84					
1.37	LB01+03/LB01	07-LB01-P010	1	11.84					
1.38	LB01+03/LB01	07-LB01-S001	2						
1.39	LB01+03/LB01	07-LB01-S003	1						
1.40	LB01+03/LB01	07-LB01-S004	1						
1.41	LB01+03/LB01	07-LB01-S006	1						
1.42	LB01+03/LB01	07-LB01-S007	1						
1.43	LB01+03/LB01	07-LB01-S009	1						
1.44	LB01+03/LB01	07-LB01-S010	3						
1.45	LB01+03/LB01	07-LB01-S011	1						
1.46	LB01+03/LB01	BKT092	3						
1.47	LB01+03/LB03	07-LB03-P005	1						
1.48	LB01+03/LB03	07-LB03-P009	1						
1.49	LB01+03/LB03	07-LB03-S008	1						
1.50	LB01+03/LB03	07-LB03-S018	1						
1.51	LB01+03/LB03	07-LB03-S019	2						
1.52	LB01+03S/LB01+03	LB01	1		10.00	240.00			
1.53	LB01+03S/LB01+03	LB03	1		10.00	180.00	5.12		
1.54	VT01/LB05	07-LB05-P001	1						
1.55	VT01/LB05	07-LB05-P002	1						
1.56	VT01/LB05	07-LB05-S001	1						
1.57	VT01/LB05	07-LB05-S002	1						
1.58	VT01/TB41S	07-TB41S-P001	1						
1.59	VT01/TB41S	07-TB41S-S001	1						
1.60	VT01/TB41S	07-TB41S-S002	1						
1.61	VT01/TB41S	07-TB41S-S003	1						
1.62	VT01/TB39S	07-TB39S-P001	1						
1.63	VT01/TB39S	07-TB39S-S002	1						
1.64	VT01/TB39S	07-TB39S-S003	1						
1.65	VT01/TB39S	07-TB39S-S004	1						
1.66	LB01+03S/VT01	LB05	1		10.00	180.00			
1.67	LB01+03S/VT01	TB39S	1		10.00	180.00	23.89	17.92	
1.68	LB01+03S/VT01	TB41S	1		10.00	180.00	23.89	17.92	

ID No.	Assy Name	Part Name	Qty	FP_Weld_Time_Side_2 (min.)	Panel_Handle_Time_to_Assembly_Sta (min.)	Panel_Fitup_Time (min.)	Panel_Weld_Time_Side_1 (min.)	Panel_Weld_Time_Side_2 (min.)	PL_Handle_Time_from_Bevel_Sta_to_Flanging_Sta (min.)
1.69	LB01+03S/DP01	07-DP01-P001	1						
1.70	LB01+03S/DP01	07-DP01-P002	1						
1.71	LB01+03S/DP01	07-DP01-P003	1						
1.72	LB01+03S/DP01	07-DP01-P004	1						
1.73	BS02/LB01+03S	DP01	1		10.00	180.00	69.55	34.78	
1.74	BS02/LB01+03S	LB01+03	1		10.00	240.00			
1.75	BS02/LB01+03S	VT01	1		10.00	240.00	47.94	23.97	
1.76	LB02+04/LB02	07-LB02-P001	1	5.49					
1.77	LB02+04/LB02	07-LB02-P007	1						
1.78	LB02+04/LB02	07-LB02-P009	5	59.21					
1.79	LB02+04/LB02	07-LB02-P011	1						
1.80	LB02+04/LB02	07-LB02-S001	1						
1.81	LB02+04/LB02	07-LB02-S002	1						
1.82	LB02+04/LB02	07-LB02-S004	1						
1.83	LB02+04/LB02	07-LB02-S005	1						
1.84	LB02+04/LB02	07-LB02-S006	1						
1.85	LB02+04/LB02	07-LB02-S007	1						
1.86	LB02+04/LB02	07-LB02-S008	1						
1.87	LB02+04/LB02	07-LB02-S009	1						
1.88	LB02+04/LB02	07-LB02-S010	3						
1.89	LB02+04/LB02	BKT092	3						
1.90	LB02+04/LB04	07-LB04-P001	1	11.84					
1.91	LB02+04/LB04	07-LB04-P002	1						
1.92	LB02+04/LB04	07-LB04-S004	2						
1.93	LB02+04/LB04	07-LB04-S008	1						
1.94	LB02+04/LB04	07-LB04-S012	1						
1.95	LB02+04P/LB02+04	LB02	1		10.00	240.00			
1.96	LB02+04P/LB02+04	LB04	1		10.00	180.00	5.12		
1.97	VT02/LB06	07-LB06-P001	1						
1.98	VT02/LB06	07-LB06-P002	1						
1.99	VT02/LB06	07-LB06-S001	1						
2.00	VT02/LB06	07-LB06-S002	1						
2.01	VT02/TB41P	07-TB41P-P001	1						
2.02	VT02/TB41P	07-TB41P-S001	1						
2.03	VT02/TB41P	07-TB41P-S002	1						
2.04	VT02/TB41P	07-TB41P-S003	1						
2.05	VT02/TB39P	07-TB39P-P001	1						
2.06	VT02/TB39P	07-TB39P-S001	1						
2.07	VT02/TB39P	07-TB39P-S002	1						
2.08	VT02/TB39P	07-TB39P-S003	1						
2.09	LB02+04P/VT02	LB06	1		10.00	180.00			
2.10	LB02+04P/VT02	TB39P	1		10.00	180.00	23.89	17.92	

ID No.	Assy Name	Part Name	Qty	FP_Weld_Time_Side_2 (min.)	Panel_Handle_Time_to_Assembly_Sta (min.)	Panel_Fitup_Time (min.)	Panel_Weld_Time_Side_1 (min.)	Panel_Weld_Time_Side_2 (min.)	PL_Handle_Time_from_Bevel_Sta_to_Flanging_Sta (min.)
2.11	LB02+04P/VT02	TB41P	1		10.00	180.00	23.89	17.92	
2.12	LB02+04P/DP02	07-DP02-P001	1						
2.13	LB02+04P/DP02	07-DP02-P002	1						
2.14	LB02+04P/DP02	07-DP02-P003	1						
2.15	LB02+04P/DP02	07-DP02-P004	1						
2.16	BS02/LB02+04P	DP02	1		10.00	180.00	69.55	34.78	
2.17	BS02/LB02+04P	LB02+04	1		10.00	240.00			
2.18	BS02/LB02+04P	VT02	1		10.00	240.00	47.94	23.97	
2.19	BS02/TB63S	07-TB63S-P001	1						
2.20	BS02/TB63S	07-TB63S-S001	1						
2.21	BS02/TB63S	07-TB63S-S002	1						
2.22	BS02/TB63S	07-TB63S-S003	1						
2.23	BS02/TB63S	07-TB63S-S004	2						
2.24	BS02/TB63S	07-TB63S-S005	1						
2.25	BS02/TB63S	07-TB63S-S006	1						
2.26	BS02/TB63S	07-TB63S-S007	1						
2.27	BS02/TB63S	07-TB63S-S008	1						
2.28	BS02/TB63P	07-TB63P-P001	1						
2.29	BS02/TB63P	07-TB63P-S001	1						
2.30	BS02/TB63P	07-TB63P-S002	1						
2.31	BS02/TB63P	07-TB63P-S003	1						
2.32	BS03/BS02	BS01	1		10.00	300.00			
2.33	BS03/BS02	LB01+03S	1		10.00	240.00	160.07	120.05	
2.34	BS03/BS02	LB02+04P	1		10.00	240.00	160.07	120.05	
2.35	BS03/BS02	TB63P	1		10.00	180.00	25.43	19.08	
2.36	BS03/BS02	TB63S	1		10.00	240.00	39.12	29.34	
2.37	BS03/BS02	07-DK03-P031	1						
2.38	BS03/SN01	07-SN01-S025	16						
2.39	BS03/SN01	BKT096	32						
2.40	BS04/BS03	BS02	1		10.00	300.00			
2.41	BS04/BS03	SN01	1		10.00	240.00	86.70		
2.42	BS04/BS03	07-DK01-F002	1						
2.43	BS04/BS03	07-DK01-F003	1						
2.44	BS04/BS03	07-DK01-P007	1						
2.45	BS04/BS03	07-DK01-P010	1	5.52					
2.46	BS04/BS03	07-DK01-S063	1						
2.47	BS04/BS03	07-DK02-F002	1						
2.48	BS04/BS03	07-DK02-F003	1						
2.49	BS04/BS03	07-DK02-P001	1						
2.50	BS04/BS03	07-DK02-P019	1	5.52					
2.51	BS04/BS03	07-DK02-S046	1						
2.52	BS04/BS03	07-DK03-F002	1						

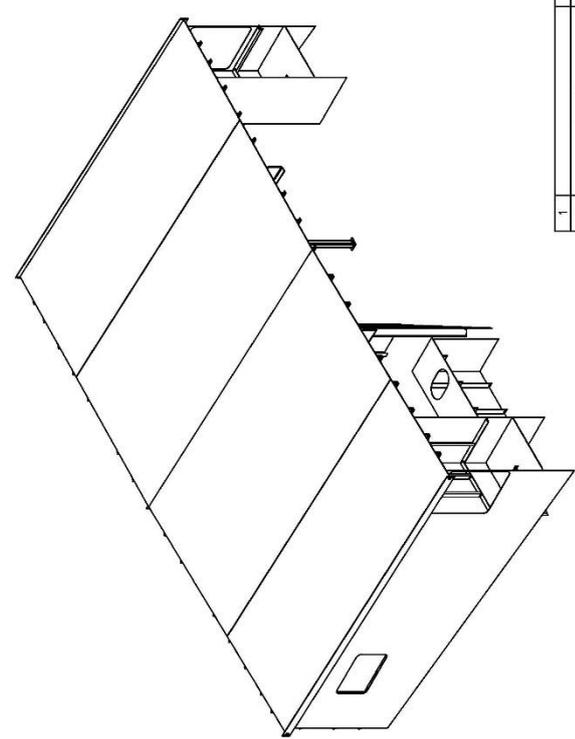
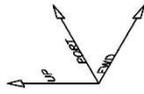
ID No.	Assy Name	Part Name	Qty	FP_Weld_Time_Side_2 (min.)	Panel_Handle_Time_to_Assembly_Sta (min.)	Panel_Fitup_Time (min.)	Panel_Weld_Time_Side_1 (min.)	Panel_Weld_Time_Side_2 (min.)	PL_Handle_Time_from_Bevel_Sta_to_Flanging_Sta (min.)
2.53	BS04/BS03	07-DK04-F001	1						
2.54	BS04/BS03	07-LB01-S012	1						
2.55	BS04/BS03	07-LB02-S023	1						
2.56	BS04/BS03	BKT095	10						
2.57	BS04/ST01S	07-ST01S-P001	1						
2.58	BS04/ST01S	07-ST01S-P002	10	53.34					
2.59	BS04/ST01S	07-ST01S-S027	1						
2.60	BS04/ST01P	07-ST01P-P001	1						
2.61	BS04/ST01P	07-ST01P-P002	10	53.34					
2.62	BS04/ST01P	07-ST01P-S029	1						
2.63	BS04/ST02	07-ST02-P001	1						
2.64	BS04/ST02	07-ST02-P002	1						
2.65	BS04/ST02	07-ST02-P003	1						
2.66	BS04/ST02	07-ST02-P004	1						
2.67	BS04/ST02	07-ST02-P005	1						
2.68	BS04/ST02	07-ST02-P006	1						
2.69	BS04/ST02	07-ST02-P007	1						
2.70	BS04/ST02	07-ST02-P008	1						
2.71	BS04/ST02	07-ST02-S025	1						
2.72	BS04/ST02	07-ST02-S026	1						
2.73	BS04/ST02	07-ST02-S028	1						
2.74	BS04/ST03S	07-ST03S-P007	2	10.67					
2.75	BS04/ST03S	07-ST03S-P018	1						
2.76	BS04/ST03S	07-ST03S-P020	1						
2.77	BS04/ST03P	07-ST03P-P019	1						
2.78	BS04/ST03P	07-ST03P-P021	2	10.67					
2.79	BS04/ST03P	07-ST03P-P022	1						
2.80	GE/BS04	BS03	1		10.00	300.00			
2.81	GE/BS04	ST01P	1		10.00	180.00	36.06		
2.82	GE/BS04	ST01S	1		10.00	180.00	36.06		
2.83	GE/BS04	ST02	1		10.00	180.00	14.67	14.67	
2.84	GE/BS04	ST03P	1		10.00	180.00	6.73	6.73	
2.85	GE/BS04	ST03S	1		10.00	180.00	6.73	6.73	
2.86	GE/BS04	07-DK01-P015	1						
2.87	GE/BS04	07-DK01-P019	1						
2.88	GE/BS04	07-DK02-P004	1						
2.89	GE/BS04	07-DK02-P007	1						



## **APPENDIX M**

REV	DESCRIPTION	DATE	APPROVED
-	FIRST ISSUED	08-12-2014	SM
A	LABELED STIFFENER STAGE TO LONGIT. BHD 17'-0" P/S, SHS 16 AND 19 AND RENUMBERED THE FOLLOWING SHEETS TO SUIT.	08-29-2014	SM

SHEET #	DESCRIPTION	REV
01	COVER PAGE	A
02	UPPER DK S PLATES	-
03	UPPER DK S SUPER PANEL	-
04	UPPER DK S + STIFFENERS	-
05	UPPER DK S + GIRDERS	-
06	UPPER DK P PLATES	-
07	UPPER DK P SUPER PANEL	-
08	UPPER DK P + STIFFENERS	-
09	UPPER DK P + GIRDERS	-
10	BUILD STAGE 01	-
11	GEN FO TK TOP + STIFFENERS	-
12	GEN FO TK SIDES + STIFFENERS	-
13	GEN FO TANK ASSY	-
14	LBHD CL	-
15	BHD CANT. CL-FR63	-
16	LBHD 17'10" OCL S + STIFFENERS	A
17	LBHD 17'10" OCL S + GIRDERS	A
18	LBHD 17'10" OCL P + STIFFENERS	A
19	LBHD 17'10" OCL P + GIRDERS	A
20	FR 64 S VENT TRUNK S	A
21	FR 64 S VENT TRUNK S	A
22	VENT TRUNK S	A
23	LBHD 13'8" OCL P	A
24	BHD FR 64 S VENT TRUNK P	A
25	VENT TRUNK P	A
26	BUILD STAGE 02	A



Weight: 19647.07lb  
 LCG: -135' -1 7/16" FWD/ AFT DIRECTION (+ FWD, FROM FRAME 00)  
 TCG: TCG: -4 5/16" STBD/ PORT DIRECTION (+ PORT, FROM CL)  
 VCG: VCG: 18' -9 7/16" UP/ DOWN DIRECTION (+ UP, FROM BASELINE)

NO	DWG NO	DWG TITLE
1		

REFERENCES	
GULF ISLAND FABRICATION, INC	
BK BHP TOWBOAT	
MODULE 08 ASSEMBLY DRAWINGS	

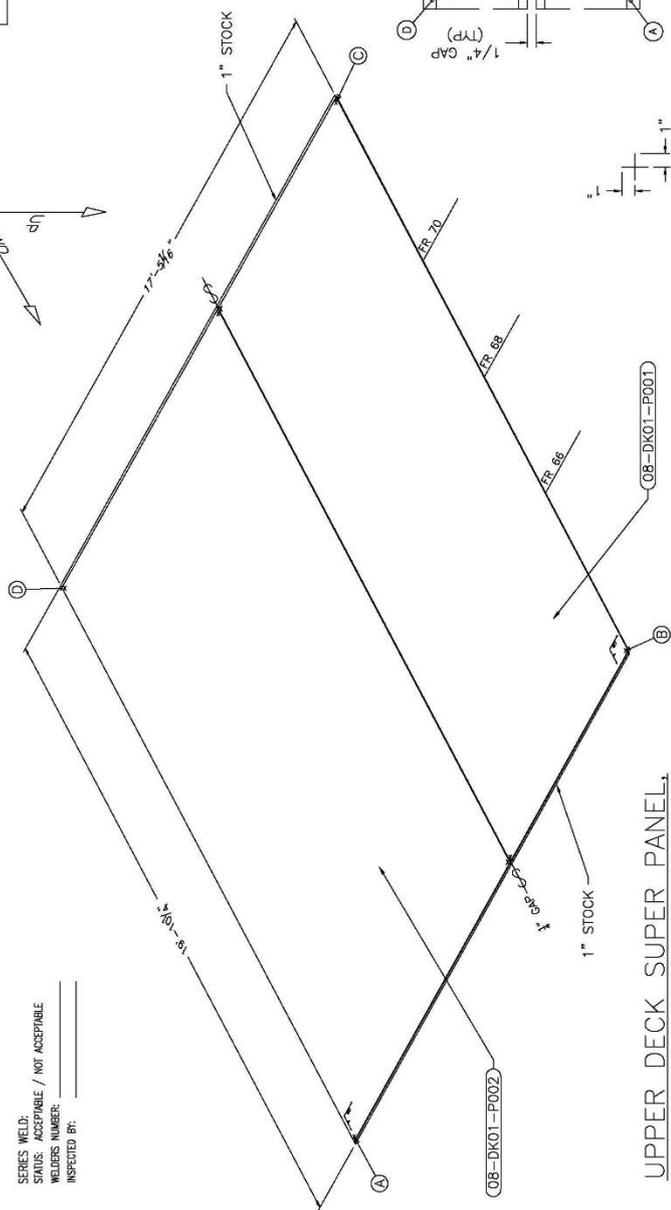
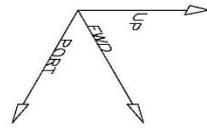
SIZE	DWG NO	REV
B	U08-U08.dwg	A
SCALE	NONE	180PB001-U08-839-001

SHEET 01 OF 26

BILL OF MATERIALS							
Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
08-DK01-P001	1	STEEL_0.25	N/A	N/A	N/A	1505.439	NT1_4-054
08-DK01-P002	1	STEEL_0.25	N/A	N/A	N/A	1990.721	NT1_4-062

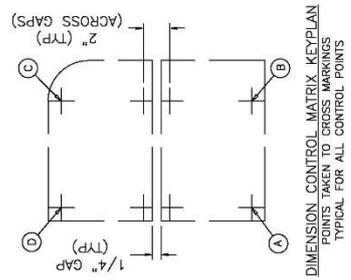
SERIES WELD:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 WELDERS NUMBER: \_\_\_\_\_  
 INSPECTED BY: \_\_\_\_\_

	B	C	D	A
	17'-3 1/16"	26'-0 1/2"	19'-6 1/16"	19'-6 1/16"
		19'-6 1/16"	26'-0 1/2"	26'-0 1/2"
			17'-3 1/16"	17'-3 1/16"



UPPER DECK SUPER PANEL,  
 STBD, BUILD STAGE 1  
 ISOMETRIC VIEW  
 N.T.S.

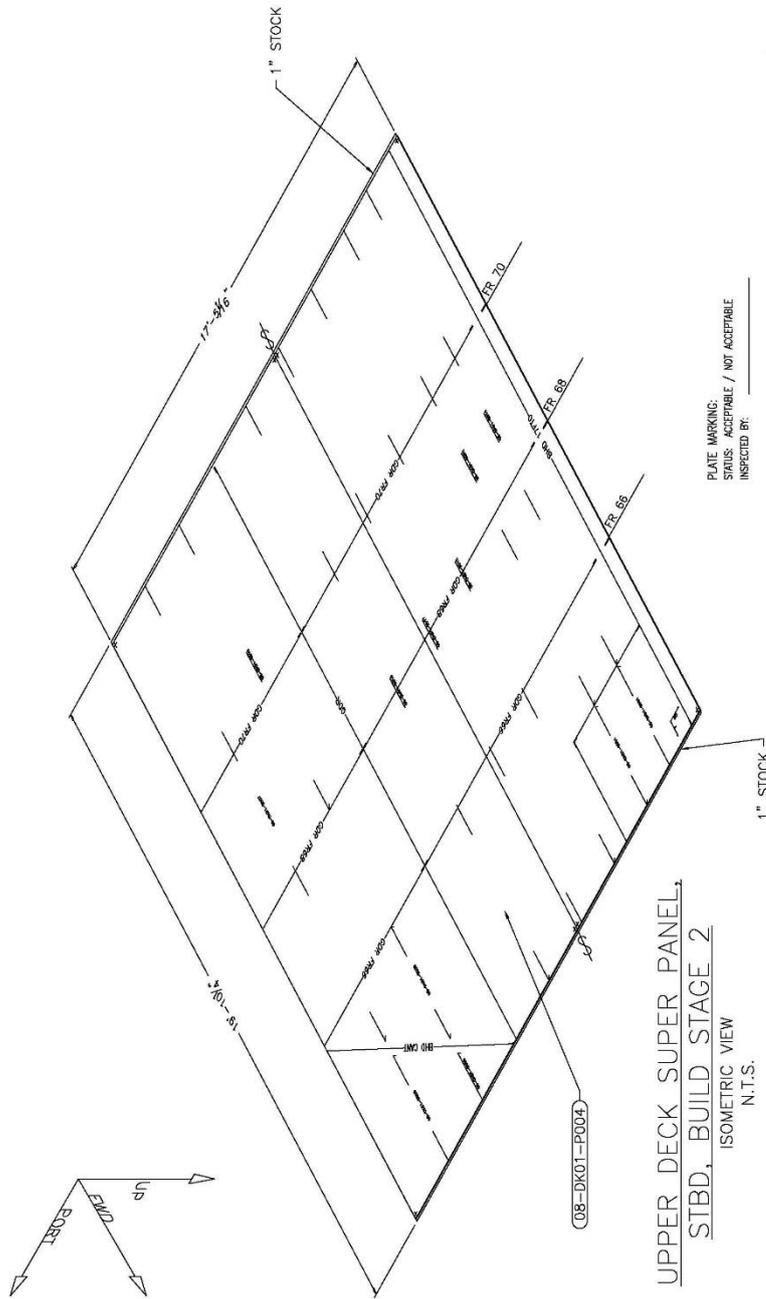
Weight: 3496.18lb  
 LCG: -135'-11"  
 TCC: -8'-9 1/2"  
 VCG: 20'-10 11/16"



SCALE	TYPING NO.	RS
B	U08-DK01.dwg	-
SCALE	NONE	180PB001-U08-839-001
		SHEET 02

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
08-DK01-P004	1	SP MARKING 0.25	N/A	N/A	N/A	0	NT_SPMARKING 1_4-001

**BILL OF MATERIALS**



UPPER DECK SUPER PANEL,  
STBD., BUILD STAGE 2  
ISOMETRIC VIEW  
N.T.S.

Weight: 0.00lb  
LCG: -135'-11"  
TCG: -8'-9 1/2"  
VCG: 20'-10 11/16"

PLATE MARKING:  
SPRUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

DK01+S/SP01	UPPER DK S SUPER PANEL
B	U08-SP01.dwg
SCALE	NONE
180PB001-U08-839-001	SHEET 03



**BILL OF MATERIALS**

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
DK01+S	1	N/A	N/A	N/A	N/A	4042.134	N/A
08-DK01-P003	1	STEEL_0.3125	N/A	N/A	N/A	19.074	NT5_16-007
08-DK01-P005	1	STEEL_0.375	N/A	N/A	N/A	201.785	NT3_B-008
08-DK01-P006	1	STEEL_0.375	N/A	N/A	N/A	195.2	NT3_B-008
08-DK01-P009	1	STEEL_0.375	N/A	N/A	N/A	189.161	NT3_B-008
08-DK01-P010	1	STEEL_0.375	N/A	N/A	N/A	126.989	NT3_B-008
08-DK01-P011	1	STEEL_0.375	N/A	N/A	N/A	189.161	NT3_B-008
08-DK01-P012	1	STEEL_0.375	N/A	N/A	N/A	189.161	NT3_B-008
08-DK01-P014	1	STEEL_0.375	N/A	N/A	N/A	125.862	NT3_B-008
08-DK01-P015	1	STEEL_0.375	N/A	N/A	N/A	126.989	NT3_B-008

STRUCTURAL CUT: \_\_\_\_\_  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL FIT: \_\_\_\_\_  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL WELD: \_\_\_\_\_  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

**UPPER DECK SUPER PANEL,  
STBD, BUILD STAGE 4**  
ISOMETRIC VIEW  
N.T.S.

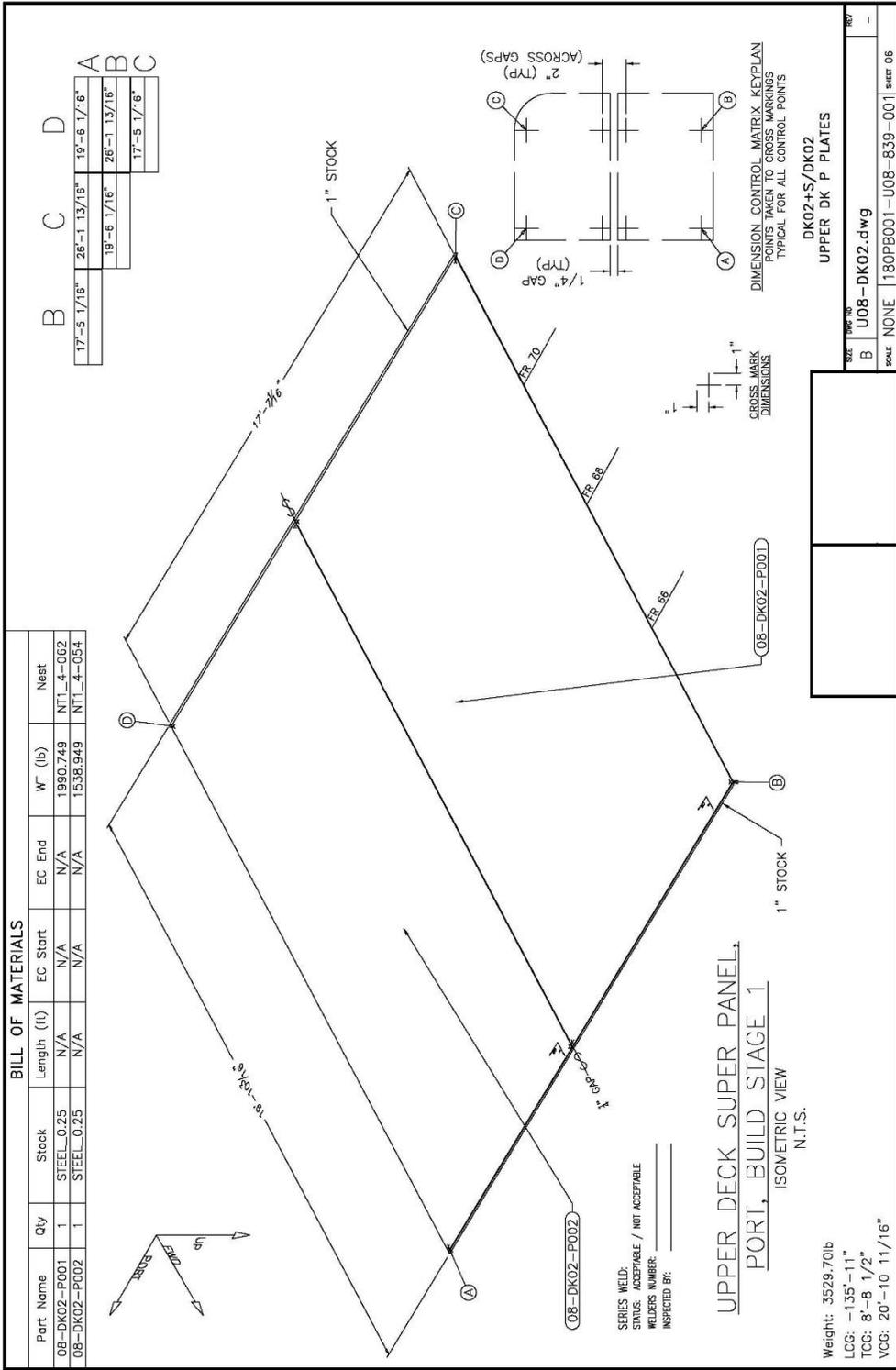
**BKT DET**  
LKG PORT - N.T.S.

**DET A**  
LKG STBD - N.T.S.

**DET B**  
LKG AFT - N.T.S.

**Weight: 5405.52lb**  
**LCG: -136'-0"**  
**TCC: -8'-6 9/16"**  
**VCC: 20'-8 5/8"**

BS01/DK01+G  
UPPER DK S + GIRDERS  
U08-DK01+G.dwg  
SCALE NONE 180PB001-U08-839-001 SHEET 05



**BILL OF MATERIALS**

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
08-DK02-P001	1	STEEL-0.25	N/A	N/A	N/A	1990.749	NT1_4-062
08-DK02-P002	1	STEEL-0.25	N/A	N/A	N/A	1538.949	NT1_4-054

	B	C	D
17'-5 1/16"	26'-1 13/16"	19'-5 1/16"	19'-5 1/16"
19'-5 1/16"	26'-1 13/16"	17'-5 1/16"	17'-5 1/16"

Weight: 3529.70lb  
 LCG: -1.35'-11"  
 TCC: 8'-8 1/2"  
 VCC: 20'-10 11/16"

UPPER DECK SUPER PANEL,  
 PORT, BUILD STAGE 1  
 ISOMETRIC VIEW  
 N.T.S.

08-DK02-P001  
 08-DK02-P002  
 08-DK02-P003

1" STOCK

1/4" GAP (TYP)  
 2" (TYP) (ACROSS GAPS)

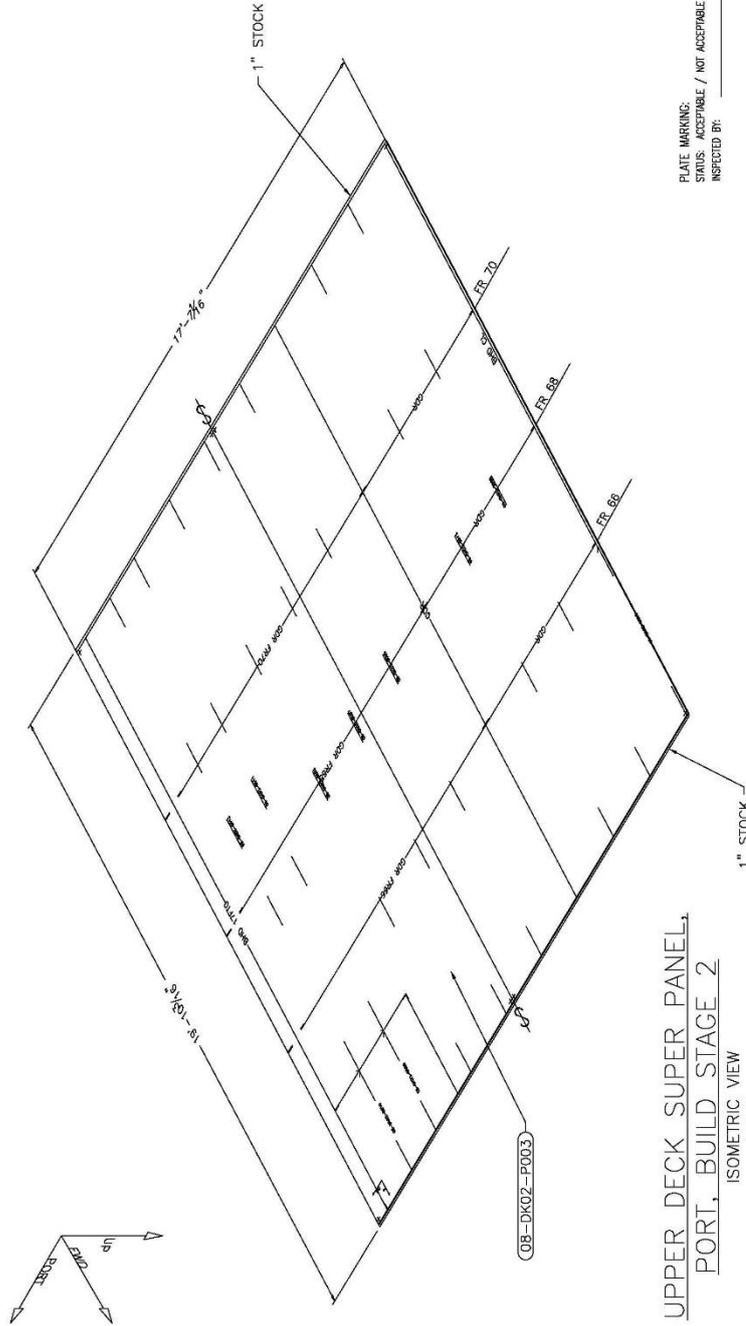
CROSS-MARK DIMENSIONS  
 DIMENSION CONTROL MATRIX KEYPLAN  
 POINTS TAKEN TO CROSS-MARKINGS  
 TYPICAL FOR ALL CONTROL POINTS

DK02+S/DK02  
 UPPER DK P PLATES

SCALE	1/8" = 1'-0"
DATE	11/10/10
BY	U08-DK02.dwg
SCALE	NONE

180PB001-U08-839-001 SHEET 06

BILL OF MATERIALS						
Part Name	Qty	Stock	Length (ft)	EC Start	EC End	Nest
08-DK02-P003	1	SP MARKING 0.25	N/A	N/A	N/A	0
			N/A	N/A	N/A	NT_SPMARKING 1_4-002



UPPER DECK SUPER PANEL  
PORT, BUILD STAGE 2  
ISOMETRIC VIEW  
N.T.S.

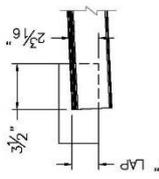
Weight: 0.00lb  
LCG: -1.35'-11"  
TCG: 8'-8 1/2"  
VCG: 20'-10 11/16"

PLATE MARKING:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

DK02+S/SP02  
UPPER DK P SUPER PANEL  
U08-SP02.dwg  
NONE | 180PB001-U08-839-001 | SHEET 07

**BILL OF MATERIALS**

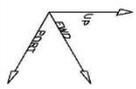
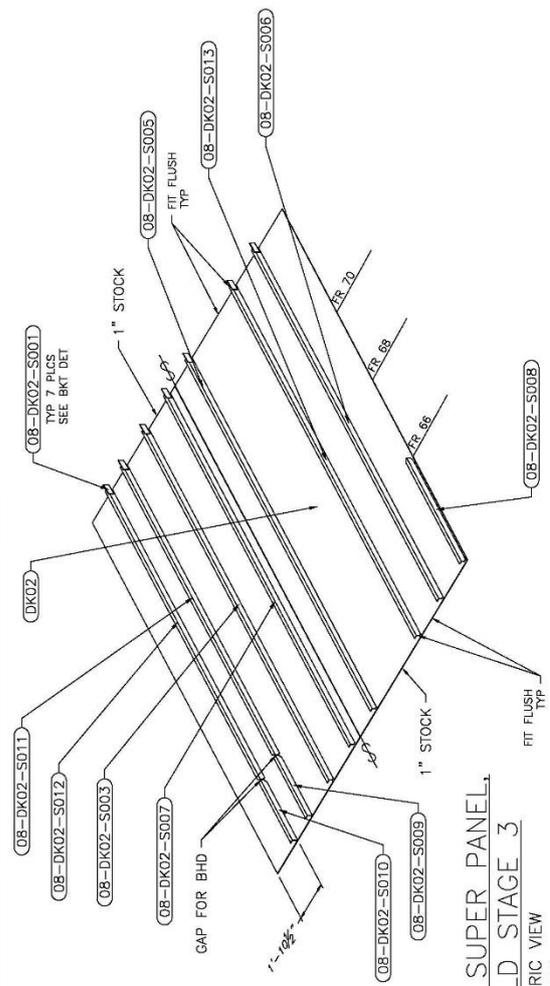
Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
DK02	1	N/A	N/A	N/A	N/A	3529.698	N/A
SR02	1	N/A	N/A	N/A	N/A	0	N/A
08-DK02-S001	7	F83X1/4	6"	None	None	1.276	N/A
08-DK02-S003	1	L3.0x2.0x.25	19'-10 5/16"	E020	None	79.017	N/A
08-DK02-S005	1	L3.0x2.0x.25	19'-10 5/16"	E020	None	79.017	N/A
08-DK02-S006	1	L3.0x2.0x.25	19'-10 5/16"	E020	None	79.017	N/A
08-DK02-S007	1	L3.0x2.0x.25	19'-10 5/16"	E020	None	79.017	N/A
08-DK02-S008	1	L3.0x2.0x.25	5'-10 1/2"	E020	E079	23.054	N/A
08-DK02-S009	1	L3.0x2.0x.25	3'-5 7/16"	None	None	13.457	N/A
08-DK02-S010	1	L3.0x2.0x.25	3'-5 7/16"	None	None	13.457	N/A
08-DK02-S011	1	L3.0x2.0x.25	16'-4 5/16"	E079	None	65.184	N/A
08-DK02-S012	1	L3.0x2.0x.25	16'-4 5/16"	E079	None	65.184	N/A
08-DK02-S013	1	L3.0x2.0x.25	19'-10 5/16"	E020	None	79.018	N/A



**BKT DET**  
LKG STBD - N.T.S.

STRUCTURAL FIT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

STRUCTURAL WELD:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_



STRUCTURAL CUT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

STRUCTURAL FIT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

STRUCTURAL WELD:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

**UPPER DECK SUPER PANEL,  
PORT, BUILD STAGE 3**  
ISOMETRIC VIEW  
N.T.S.

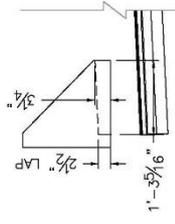
Weight: 4114.05lb  
LCG: -135'-10 13/16"  
TCC: 8'-9 5/16"  
VCC: 20'-10 3/8"

DK02+G/DK02+S	UPPER DK P + STIFFENERS
U08-DK02+S.dwg	
SCALE: NONE	180PB001-U08-839-001
DATE: 11/03/03	
BY: B	
CHK: R3	
SHEET: 08	

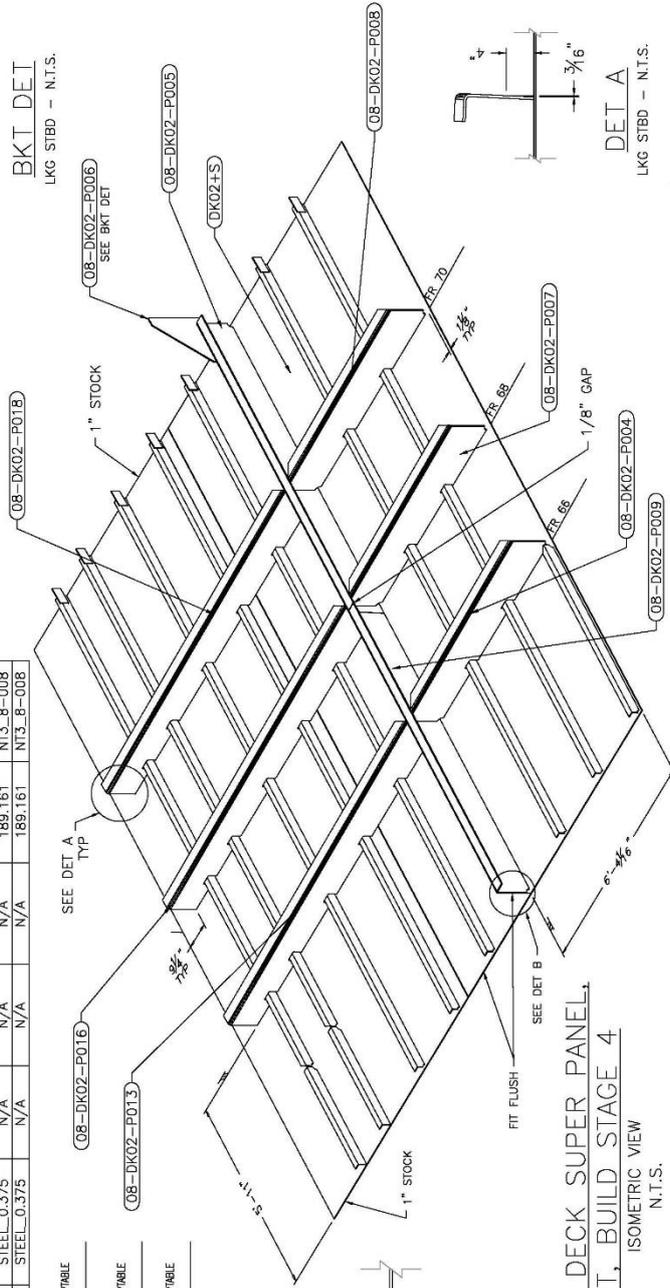
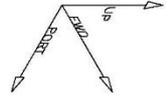
**BILL OF MATERIALS**

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
DK02+S	1	N/A	N/A	N/A	N/A	4114.052	N/A
08-DK02-P004	1	STEEL_0.375	N/A	N/A	N/A	125.862	N13_8-008
08-DK02-P005	1	STEEL_0.375	N/A	N/A	N/A	201.785	N13_8-008
08-DK02-P006	1	STEEL_0.3125	N/A	N/A	N/A	19.074	N15_16-007
08-DK02-P007	1	STEEL_0.375	N/A	N/A	N/A	125.862	N13_8-008
08-DK02-P008	1	STEEL_0.375	N/A	N/A	N/A	125.862	N13_8-008
08-DK02-P009	1	STEEL_0.375	N/A	N/A	N/A	195.899	N13_8-008
08-DK02-P013	1	STEEL_0.375	N/A	N/A	N/A	189.161	N13_8-008
08-DK02-P016	1	STEEL_0.375	N/A	N/A	N/A	189.161	N13_8-008
08-DK02-P018	1	STEEL_0.375	N/A	N/A	N/A	189.161	N13_8-008

STRUCTURAL CUT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_  
 STRUCTURAL FIT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_  
 STRUCTURAL WELD:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

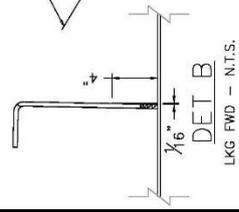
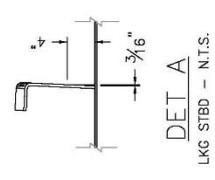


STRUCTURAL FIT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_  
 STRUCTURAL WELD:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_



**UPPER DECK SUPER PANEL,  
 PORT, BUILD STAGE 4**  
 ISOMETRIC VIEW  
 N.T.S.

Weight: 5475.88lb  
 LCG: -135'-11 9/16"  
 TCC: 8'-5 3/8"  
 VCC: 20'-8 5/8"

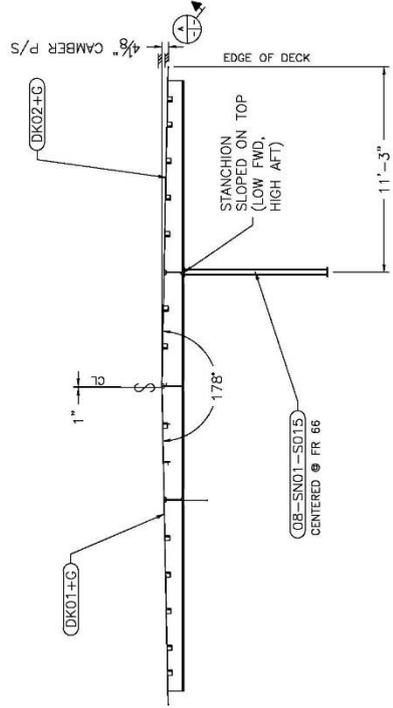
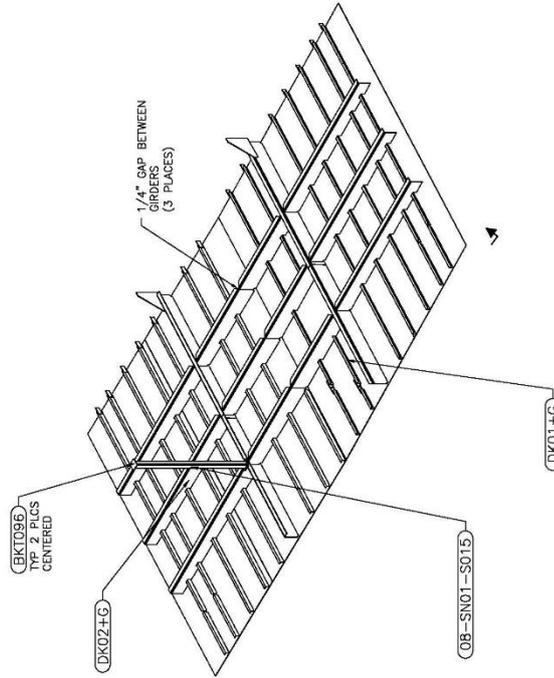
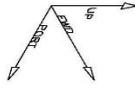


SCALE	NONE	180PB001-U08-839-001	SHEET 09
DATE	TITLE	NO.	REV.
B	U08-DK02+G.dwg		

BS01/DK02+G  
 UPPER DK P + GIRDERS

**BILL OF MATERIALS**

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
DK01+G	1	N/A	N/A	N/A	N/A	5405.515	N/A
DK02+G	1	N/A	N/A	N/A	N/A	5475.879	N/A
08-SN01-S015	1	ST4X4X0.25	7'-9" 1/4"	None	None	91.986	N/A
BKT096	2	STEEL_0.375	N/A	N/A	N/A	3.805	NT3_B-008



**SECTION VIEW A**  
LKG AFT - N.T.S.

**ISOMETRIC VIEW**  
N.T.S.

STRUCTURAL CUT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

STRUCTURAL FIT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

STRUCTURAL WELD:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

Weight: 10980.99lb  
LKG: -135'-11 5/16"  
TCC: 3/4"  
VCC: 20'-8 1/16"

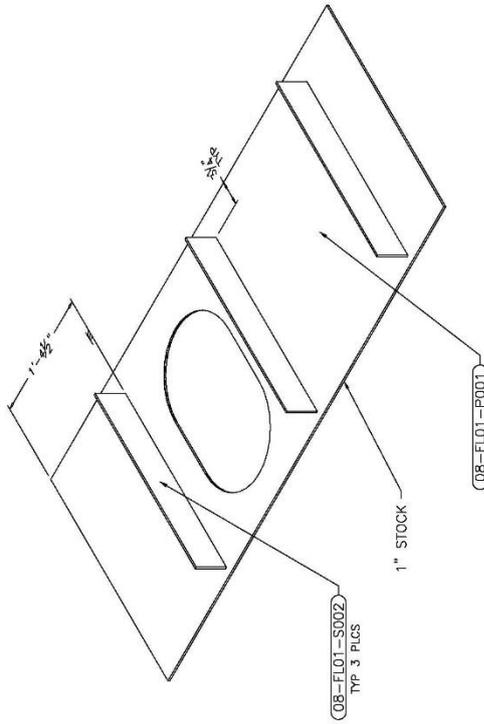
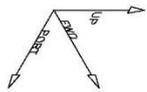
		SCALE	NONE	180PB001-U08-839-001	SHEET 10
		SCALE	NONE		
		SCALE	NONE	180PB001-U08-839-001	SHEET 10
		SCALE	NONE	180PB001-U08-839-001	SHEET 10

BS02/BS01  
BUILD STAGE 01

U08-BS01.dwg

**BILL OF MATERIALS**

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
08-FL01-P001	1	STEEL 0.25	N/A	N/A	N/A	14.1 0.39	NT1_4-060
08-FL01-S002	3	FB4x1/4	2'-3 3/4"	None	None	7.565	N/A



**ISOMETRIC VIEW**

N.T.S.

STRUCTURAL QTY: \_\_\_\_\_  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL FIT: \_\_\_\_\_  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

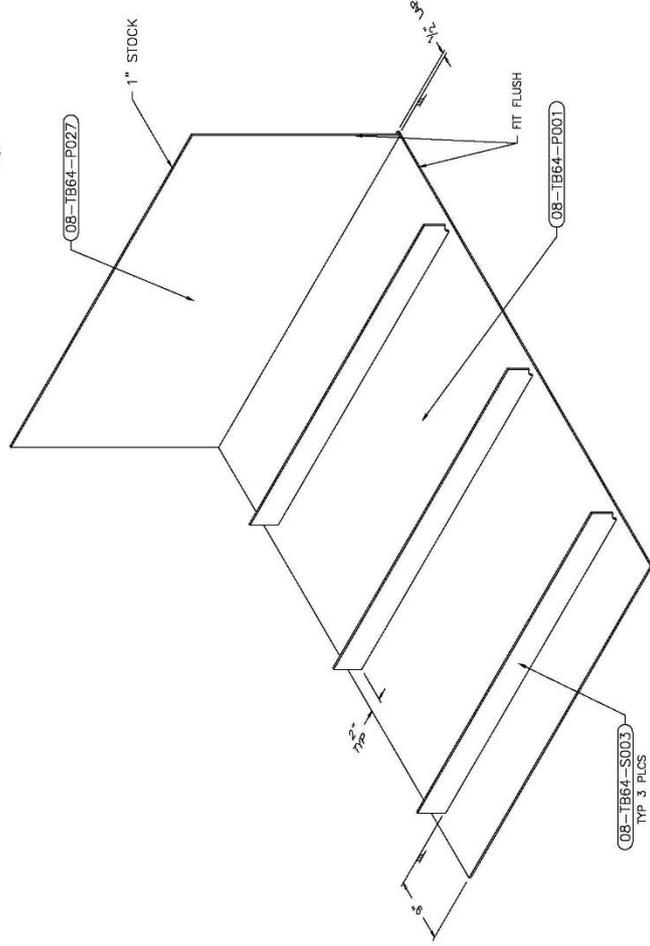
STRUCTURAL WELD: \_\_\_\_\_  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

Weight: 163.80lb  
 LCG: -127'-3 3/8"  
 TCC: -10'-0 13/16"  
 VCC: 16'-2 3/16"

FT01/FL01+S	
GEN FO TK TOP + STIFFENERS	
SCALE	180PB001-U08-839-001
SIZE	U08-FL01.dwg
REV	-
SHEET 11	

**BILL OF MATERIALS**

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
08-TB64-P001	1	STEEL_0.25	N/A	N/A	N/A	267.26	NT1_4-05B
08-TB64-P027	1	STEEL_0.25	N/A	N/A	N/A	109.669	NT1_4-05B
08-TB64-S003	3	FB4X1/4	4'-2"	None	EO20	14.123	N/A



ISOMETRIC VIEW

N.T.S.

STRUCTURAL CUT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

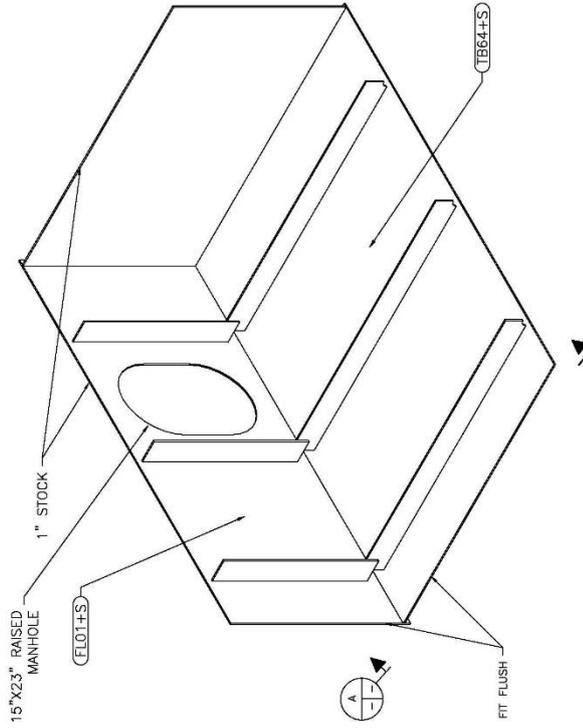
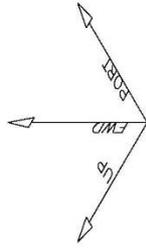
STRUCTURAL FIT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

STRUCTURAL WELD:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

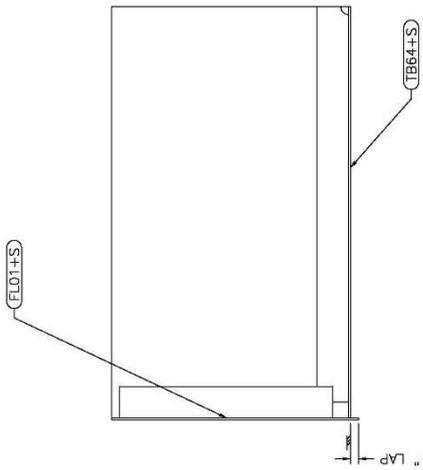
Weight: 419.30lb  
LCG: -128'-1 3/4"  
TCG: -9'-2 1/2"  
VCG: 14'-0 5/16"

FT01/TB64+S	
GEN FO TK SIDES + STIFFENERS	
SCALE	NONE
DATE	180PB001-U08-839-001
BY	U08-TB64.dwg
REV	
SHEET 12	

BILL OF MATERIALS							
Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
FL01+S	1	N/A	N/A	N/A	N/A	163.795	N/A
TB64+S	1	N/A	N/A	N/A	N/A	419.296	N/A



ISOMETRIC VIEW  
N.T.S.



SECTION VIEW A  
LKG PORT - N.T.S.

STRUCTURAL CUT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY:

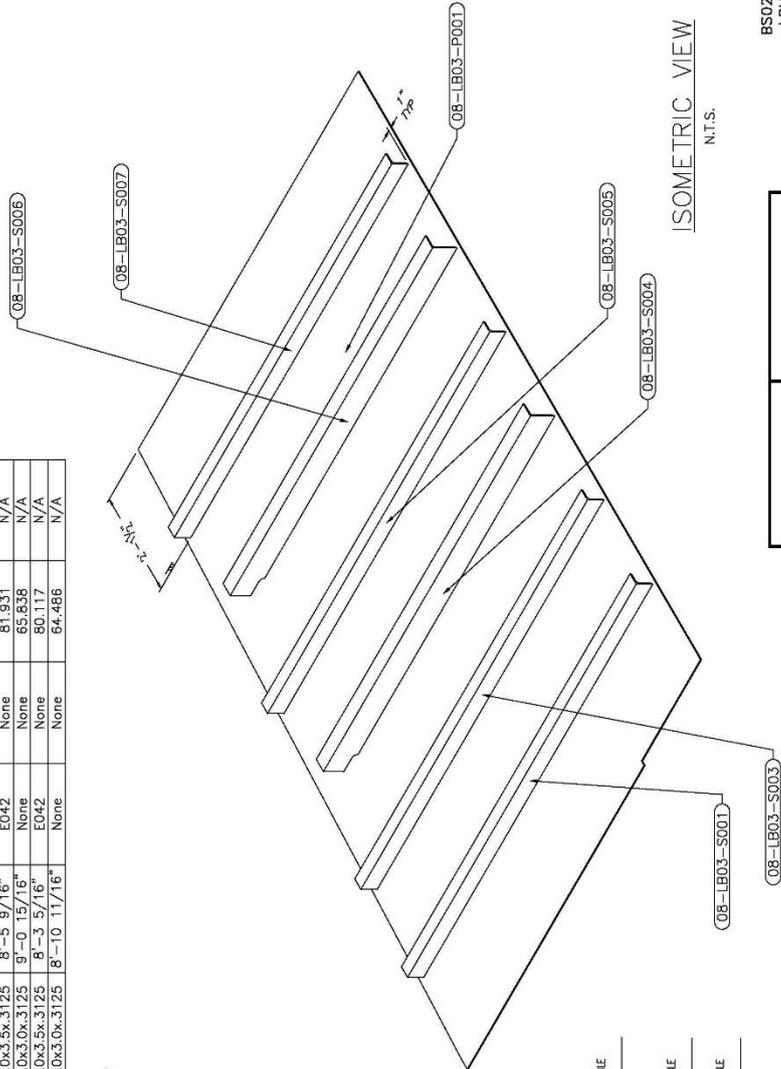
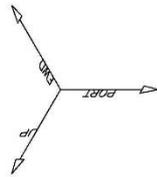
STRUCTURAL FIT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY:  
STRUCTURAL WELD:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY:

Weight: 583.09lb  
LCG: -127'-10 13/16"  
TCG: -9'-5 7/16"  
VCG: 14'-7 9/16"

BS02/FT01 GEN FO TANK ASSY	
SCALE	NONE
DATE	180PB001-U08-839-001
REV	
B	U08-FT01.dwg
SHEET 13	

**BILL OF MATERIALS**

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
08-LB03-P001	1	STEEL 0.25	N/A	N/A	N/A	1340.437	NT1-4-05B
08-LB03-S001	1	L4.0x3.0x.3125	9'-4 1/4"	None	None	67.867	N/A
08-LB03-S003	1	L4.0x3.0x.3125	9'-3 1/8"	None	None	67.191	N/A
08-LB03-S004	1	L6.0x3.5x.3125	8'-5 9/16"	E042	None	81.931	N/A
08-LB03-S005	1	L4.0x3.0x.3125	9'-0 15/16"	None	None	65.838	N/A
08-LB03-S006	1	L6.0x3.5x.3125	8'-3 5/16"	E042	None	80.117	N/A
08-LB03-S007	1	L4.0x3.0x.3125	8'-10 11/16"	None	None	64.486	N/A



ISOMETRIC VIEW

N.T.S.

STRUCTURAL CUT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL FIT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL WELD:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

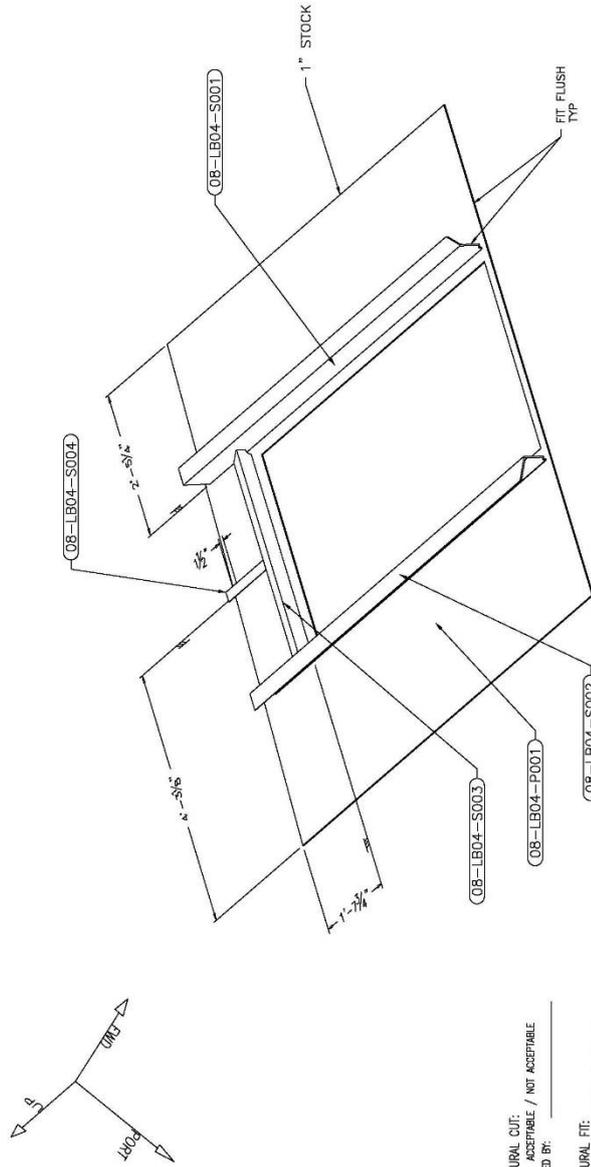
Weight: 1767.87lb  
 LCG: -1.38'-11 3/4"  
 TCC: -1.3/16"  
 VCC: 16'-5 15/16"

BS02/LB03  
 LBHD / CL

SCALE	TYPING NO.	RS
B	U08-LB03+S.dwg	-
SCALE	NONE	180PB001-U08-839-001
		SHEET 14

**BILL OF MATERIALS**

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
08-LB04-P001	1	STEEL 0.25	N/A	N/A	N/A	536.458	NT1-4-060
08-LB04-S001	1	L6.0x3.5x.3125	8'-7 1/8"	None	E014	85.041	N/A
08-LB04-S002	1	L6.0x3.5x.3125	8'-6 3/16"	None	E014	82.257	N/A
08-LB04-S003	1	L3.0x2.0x.25	3'-8"	E079	E079	14.405	N/A
08-LB04-S004	1	L3.0x2.0x.25	1'-3 5/8"	E002	None	4.987	N/A



**ISOMETRIC VIEW**

N.T.S.

STRUCTURAL CUT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY:

STRUCTURAL FIT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY:

STRUCTURAL WELD:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY:

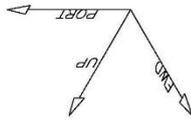
Weight: 721.15lb  
LCG: -129'-0 1/2"  
TCG: -3'-1 9/16"  
VCG: 16'-6 7/8"

SCALE	NONE	180PB001-U08-839-001	SHEET 15
DATE	TITLE NO.	U08-LB04.dwg	RS
B			

BS02/LB04  
BHD CANT CL-FR63

**BILL OF MATERIALS**

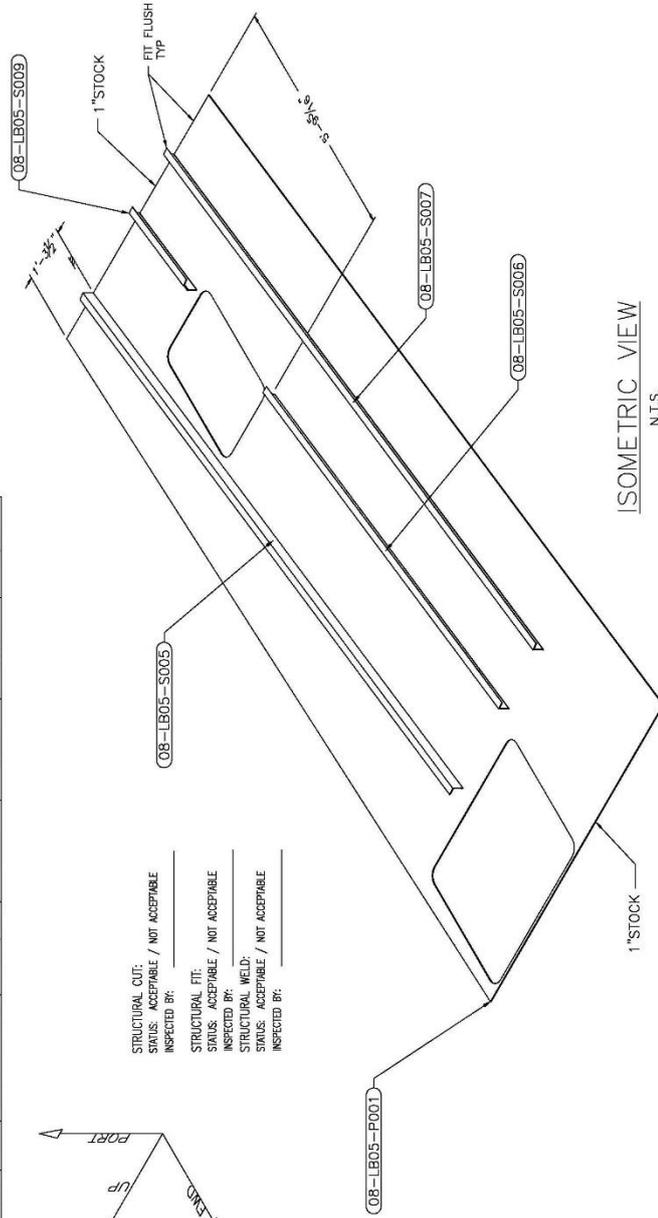
Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
08-LB05-P001	1	STEEL 0.25	N/A	N/A	N/A	1342.711	NT1-4-060
08-LB05-S005	1	L3.0x2.0x.1875	16'-2 1/4"	None	None	49.037	N/A
08-LB05-S006	1	L3.0x2.0x.1875	10'-3 3/8"	None	None	31.255	N/A
08-LB05-S007	1	L3.0x2.0x.1875	16'-2 1/4"	None	None	49.033	N/A
08-LB05-S009	1	L3.0x2.0x.1875	2'-7 1/16"	None	E002	7.437	N/A



STRUCTURAL CUT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL FIT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL WELD:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_



**ISOMETRIC VIEW**  
 N.T.S.

Weight: 1479.47lb  
 LCG: -136'-2 9/16"  
 TCC: -16'-11 11/16"  
 VCC: 16'-8 5/8"

LB05+G/LB05+S	
LBHD 17FT0 OCL S + STIFFENERS	
SCALE	180PB001-U08-839-001
REV	A
B	U08-LB05+S.dwg
SCALE	NONE
SHEET 16	

### BILL OF MATERIALS

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
LB05+S	1	N/A	N/A	N/A	N/A	1479.473	N/A
08-LB05-S001	1	L6.0x3.5x.3125	7'-10 1/8"	E013	None	73.413	N/A
08-LB05-S002	1	L6.0x3.5x.3125	7'-6 1/2"	E013	None	70.444	N/A
08-LB05-S003	1	L6.0x3.5x.3125	7'-2 13/16"	E013	None	68.4	N/A
08-LB05-S004	1	L3.0x2.0x.1875	3'-4 3/4"	None	E020	10.086	N/A
08-LB05-S008	1	L3.0x2.0x.1875	3'-11 1/4"	None	E020	11.854	N/A
08-LB05-S010	2	FB3x1/4	6"	None	None	1.276	N/A
08-LB05-S011	4	FB3x1/4	6"	None	None	1.276	N/A
08-LB05-S012	1	L3.0x2.0x.1875	3'-3"	E020	E020	9.816	N/A

**BKT DET**  
LKG DWN - N.T.S.

STRUCTURAL FIT: \_\_\_\_\_  
STATUS: ACCEPTABLE / NOT ACCEPTABLE

INSPECTED BY: \_\_\_\_\_

STRUCTURAL WELD: \_\_\_\_\_  
STATUS: ACCEPTABLE / NOT ACCEPTABLE

INSPECTED BY: \_\_\_\_\_

**ISOMETRIC VIEW**  
N.T.S.

STRUCTURAL CUT: \_\_\_\_\_  
STATUS: ACCEPTABLE / NOT ACCEPTABLE

INSPECTED BY: \_\_\_\_\_

STRUCTURAL FIT: \_\_\_\_\_  
STATUS: ACCEPTABLE / NOT ACCEPTABLE

INSPECTED BY: \_\_\_\_\_

STRUCTURAL WELD: \_\_\_\_\_  
STATUS: ACCEPTABLE / NOT ACCEPTABLE

INSPECTED BY: \_\_\_\_\_

Weight: 1731.14lb  
LCG: -136'-2 7/16"  
TCG: -16'-11 1/8"  
VCG: 16'-8 13/16"

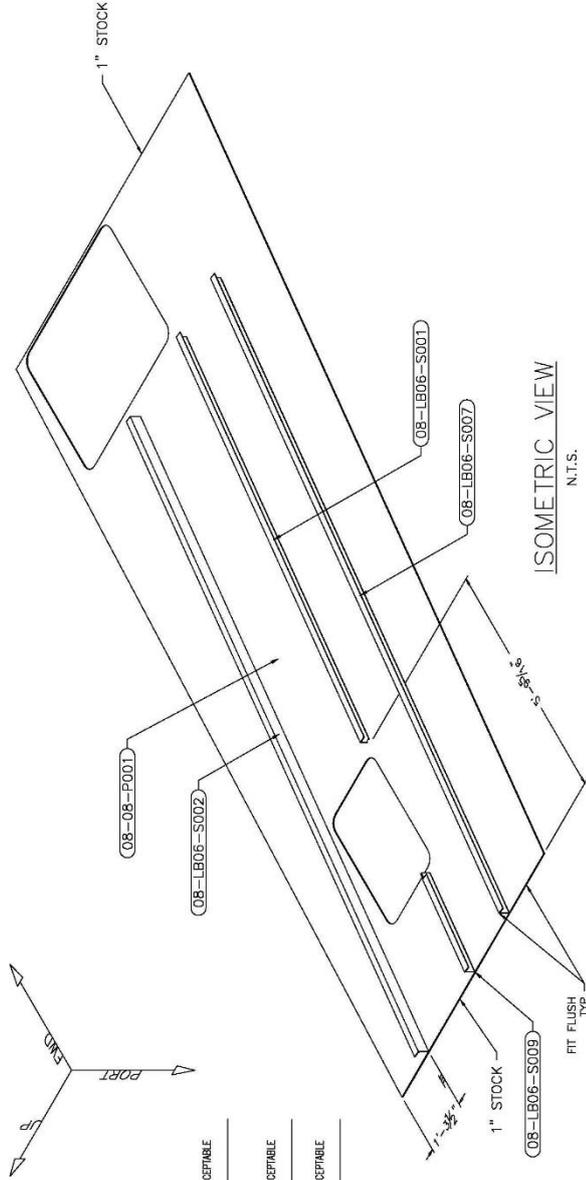
BS02/LB05+G  
LBHD 17FT0 OCL S + GIRDERS

SCALE	TYPING NO.	REV.
NONE	U08-LB05+G.dwg	A
SCALE	NONE	180PB001-U08-839-001

SHEET 17

**BILL OF MATERIALS**

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
08-08-P001	1	STEEL 0.25	N/A	N/A	N/A	1342.711	NTT-4-05B
08-LB06-S001	1	L3.0x2.0x.1875	10'-3 3/8"	None	None	31.255	N/A
08-LB06-S002	1	L3.0x2.0x.1875	16'-2 1/4"	None	None	49.037	N/A
08-LB06-S007	1	L3.0x2.0x.1875	16'-2 1/4"	None	None	49.033	N/A
08-LB06-S009	1	L3.0x2.0x.1875	2'-7 1/16"	E002	None	7.437	N/A



STRUCTURAL CUT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL FIT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL WELD:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

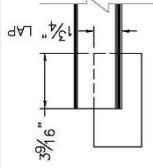
Weight: 1479.47lb  
 LCG: -136'-2 9/16"  
 TCC: 16'-11 11/16"  
 VCC: 16'-8 5/8"

LB06+G/LB06+S  
 LBHD 17FT0 OCL P + STIFFENERS

SCALE	NONE	180PB001-U08-839-001	SHEET 18
REV	B	U08-LB06+S.dwg	A

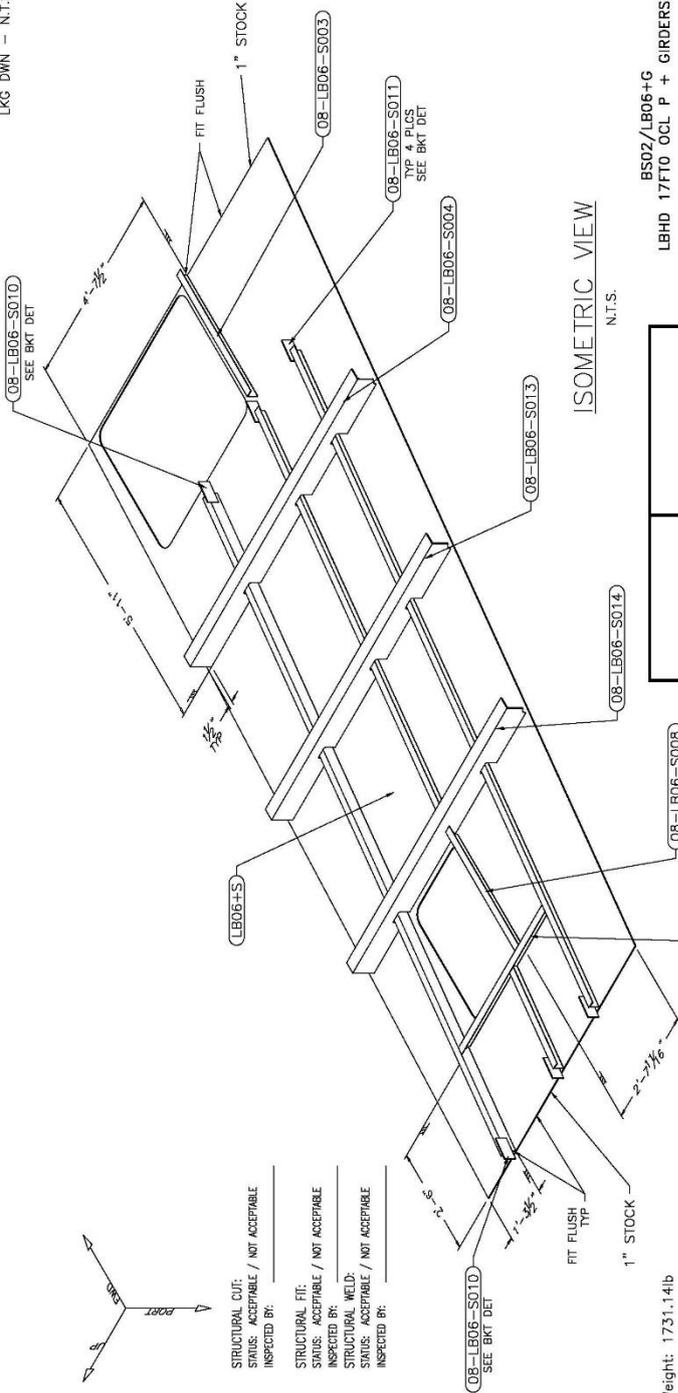
**BILL OF MATERIALS**

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
LB06+S	1	N/A	N/A	N/A	N/A	1479.473	N/A
08-LB06-S003	1	L3.0x2.0x.1875	3'-4.3/4"	None	None	10.086	N/A
08-LB06-S004	1	L6.0x3.5x.3125	7'-10.1/8"	E013	E013	73.413	N/A
08-LB06-S008	1	L3.0x2.0x.1875	3'-3"	E020	E020	9.816	N/A
08-LB06-S010	2	FB3x1/4	6"	None	None	1.276	N/A
08-LB06-S011	4	FB3x1/4	6"	None	None	1.276	N/A
08-LB06-S012	1	L3.0x2.0x.1875	3'-11.1/4"	E020	E020	11.854	N/A
08-LB06-S013	1	L6.0x3.5x.3125	7'-6.1/2"	None	E013	70.444	N/A
08-LB06-S014	1	L6.0x3.5x.3125	7'-2.13/16"	None	E013	68.4	N/A



**BKT DET**  
LKG DWN - N.T.S.

STRUCTURAL FIT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_  
STRUCTURAL WELD:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_



**ISOMETRIC VIEW**

N.T.S.

BS02/LB06+G  
LBHD 17FT0 OCL P + GIRDERS  
U08-LB06+G.dwg  
SCALE NONE | 180PB001-U08-839-001 | SHEET 19

Weight: 1731.14lb  
LCG: -136'-2.7/16"  
TCG: 16'-11.1/8"  
VCG: 16'-8.13/16"

STRUCTURAL CUT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_  
STRUCTURAL FIT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_  
STRUCTURAL WELD:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

08-LB06-S010  
SEE BKT DET

LB06+S

08-LB06-S010  
SEE BKT DET

08-LB06-S011  
LKG DWN  
SEE BKT DET

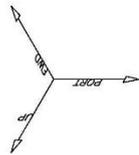
08-LB06-S004

08-LB06-S013

08-LB06-S014

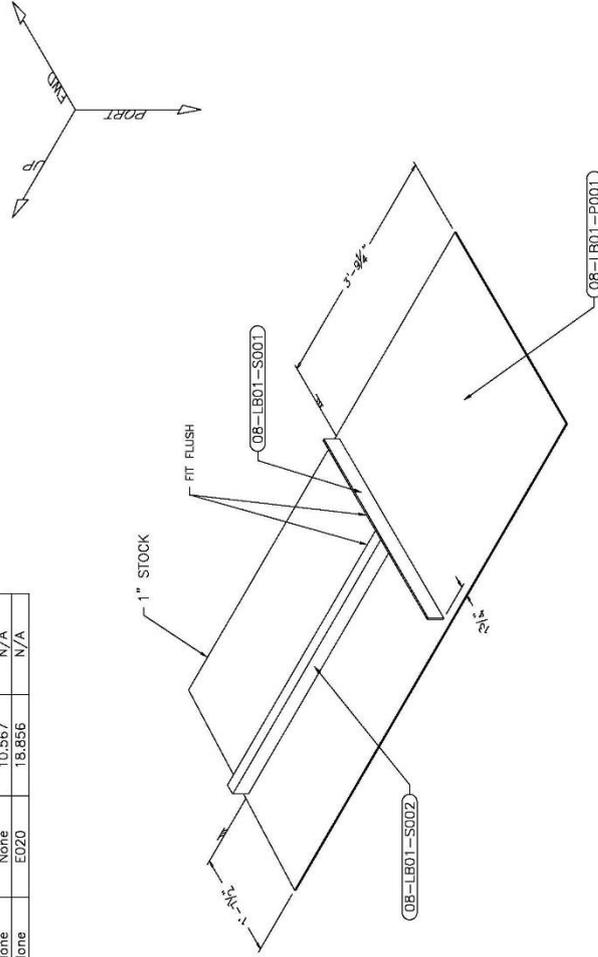
08-LB06-S008

08-LB06-S012



**BILL OF MATERIALS**

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
08-LB01-P001	1	STEEL_0.25	N/A	N/A	N/A	309.217	NT1_4-059
08-LB01-S001	1	FB3x5/16	3'-3 3/4"	None	None	10.567	N/A
08-LB01-S002	1	L3.0x2.0x.25	4'-8 1/2"	None	E020	18.856	N/A



**ISOMETRIC VIEW**

N.T.S.

STRUCTURAL CUT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL FIT:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

STRUCTURAL WELD:  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

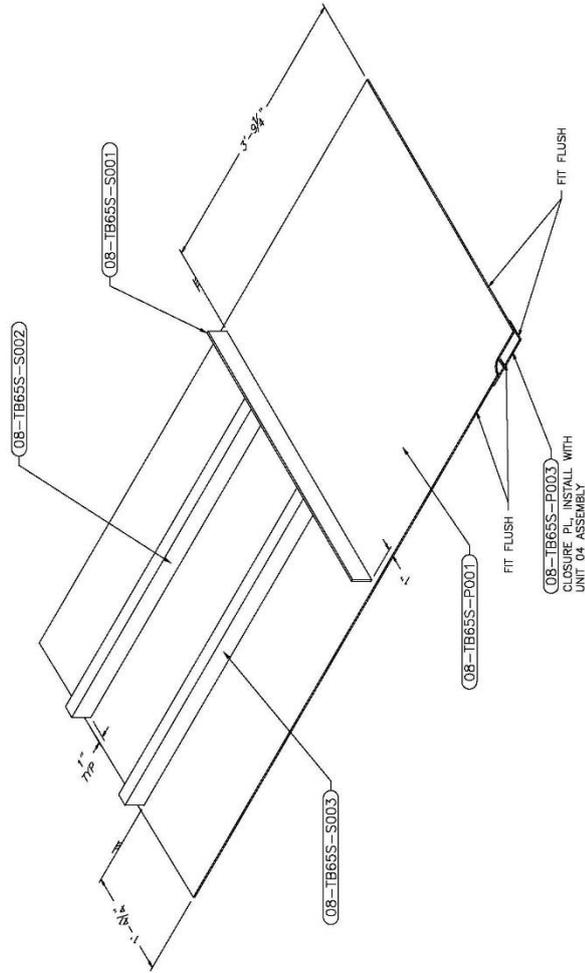
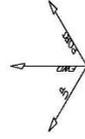
Weight: 338.64lb  
 LCG: -127'-9 3/8"  
 TCC: -13'-0 1/16"  
 VCC: 16'-2 3/4"

VT01/LB01  
 LBHD 13FT0 OCL S

SCALE	TEMP NO	REV
B	U08-LB01.dwg	A
SCALE	NONE	180PB001-U08-839-001
		SHEET 20

**BILL OF MATERIALS**

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
08-TB655-P001	1	STEEL_0.25	N/A	N/A	N/A	348.401	NTI_4-059
08-TB655-P003	1	STEEL_0.25	N/A	N/A	N/A	1.945	NTI_4-060
08-TB655-S001	1	FB3K5/16	3'-9 3/4"	None	None	12.162	N/A
08-TB655-S002	1	L3.0x2.0x.25	4'-8 3/4"	None	E020	18.93	N/A
08-TB655-S003	1	L3.0x2.0x.25	4'-8 7/16"	None	E020	18.921	N/A



**ISOMETRIC VIEW**

N.T.S.

STRUCTURAL CUT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

STRUCTURAL FIT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

STRUCTURAL WELD:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

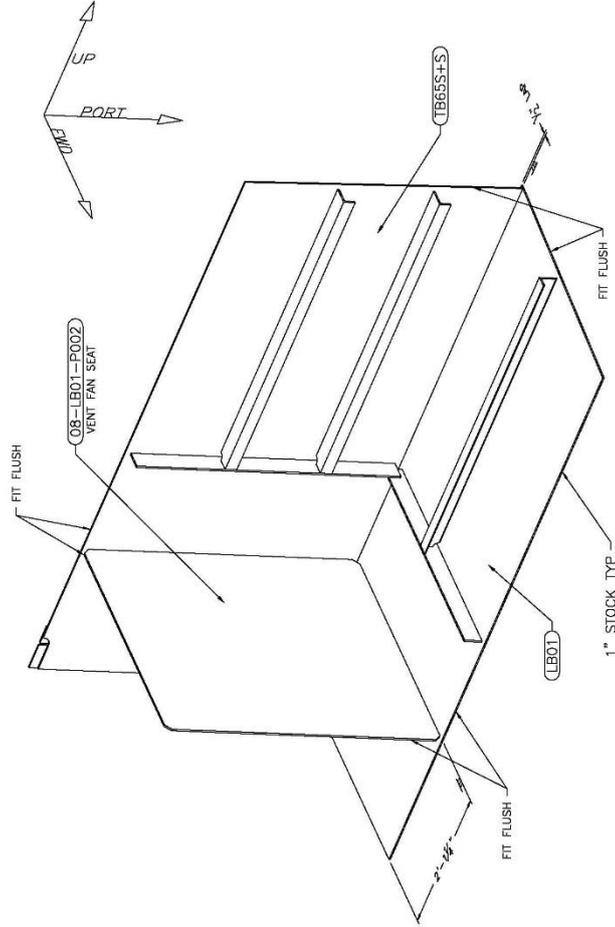
Weight: 400.26lb  
LCG: -129'-5 5/8"  
TCG: -14'-11 13/16"  
VCG: 16'-3 11/16"

VT01/TB655+S  
BHD FR 64.5 VENT TRUNK S

SCALE	NONE
DATE	180PB001-U08-839-001
REV	A
NO.	U08-TB655.dwg

**BILL OF MATERIALS**

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
LB01	1	N/A	N/A	N/A	N/A	338.64	N/A
TB65S+S	1	N/A	N/A	N/A	N/A	400.259	N/A
08-LB01-P002	1	STEEL_0.3125	N/A	N/A	N/A	176.48	NT5_16-007



**ISOMETRIC VIEW**

N.T.S.

STRUCTURAL CUT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

STRUCTURAL FIT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

STRUCTURAL WELD:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

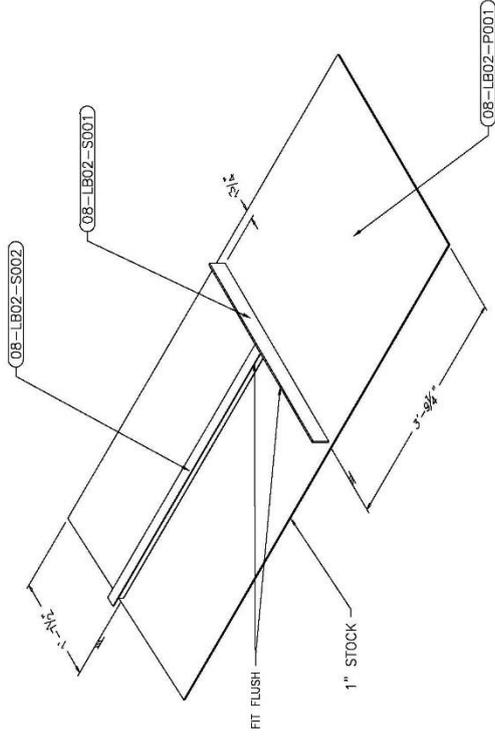
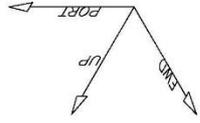
Weight: 915.38lb  
LCG: -128'-6 1/8"  
TCG: -14'-3"  
VCG: 15'-9 7/8"

BS02/VT01  
VENT TRUNK S

SCALE	NONE	180PB001-U08-839-001	SHEET 22
DATE	TWP NO	RS	AS
B	U08-VT01.dwg		A

**BILL OF MATERIALS**

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
08-LB02-P001	1	STEEL-0.25	N/A	N/A	N/A	308.22	NT1-4-060
08-LB02-S001	1	FB3x5/16	3'-3 3/4"	None	None	10.567	N/A
08-LB02-S002	1	L3.0x2.0x.25	4'-8 1/2"	E020	None	18.856	N/A



ISOMETRIC VIEW  
N.T.S.

STRUCTURAL CUT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

STRUCTURAL FIT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

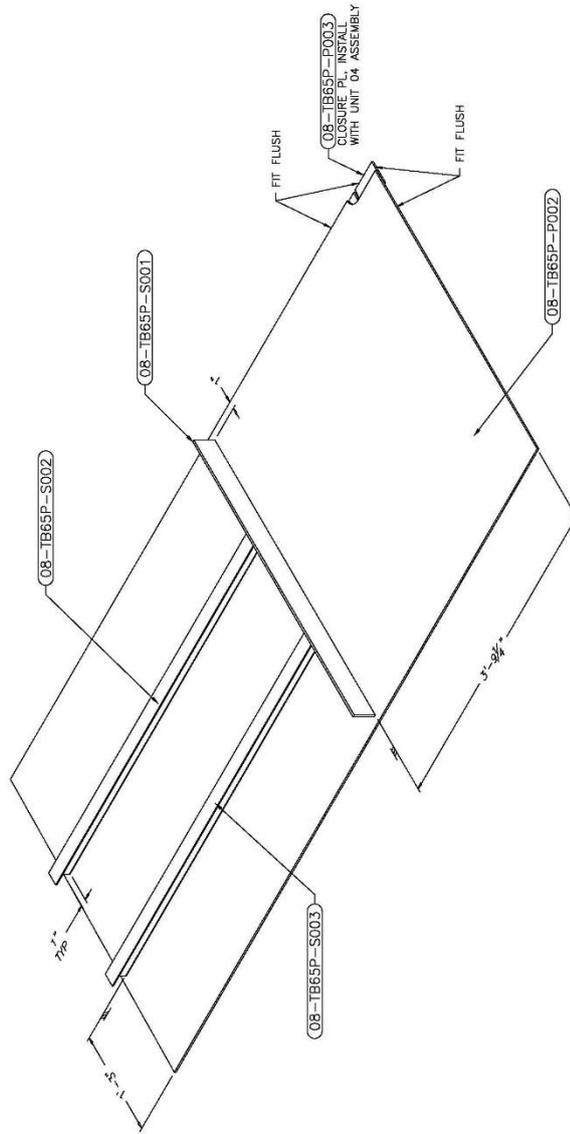
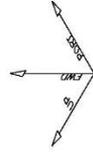
STRUCTURAL WELD:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

Weight: 338.64lb  
LCG: -127'-9 3/8"  
TCG: 13'-0 1/16"  
VCG: 16'-2 3/4"

VT02/LB02+S		REV	A
LBHD 15FT0 OCL P			
SCALE	TYP NO		
B	U08-LB02.dwg		
SCALE	NONE	180PB001-U08-839-001 SHEET 23	

**BILL OF MATERIALS**

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
08-TB65P-P002	1	STEEL_0.25	N/A	N/A	N/A	348.401	NT1_4-060
08-TB65P-P003	1	STEEL_0.25	N/A	N/A	N/A	1.945	NT1_4-060
08-TB65P-S001	1	FB3K5/16	3'-9 3/4"	None	None	12.162	N/A
08-TB65P-S002	1	L3.0x2.0x.25	4'-8 7/16"	E020	None	18.821	N/A
08-TB65P-S003	1	L3.0x2.0x.25	4'-8 3/4"	E020	None	18.93	N/A



**ISOMETRIC VIEW**  
N.T.S.

STRUCTURAL CUT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

STRUCTURAL FIT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

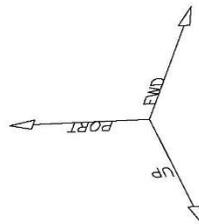
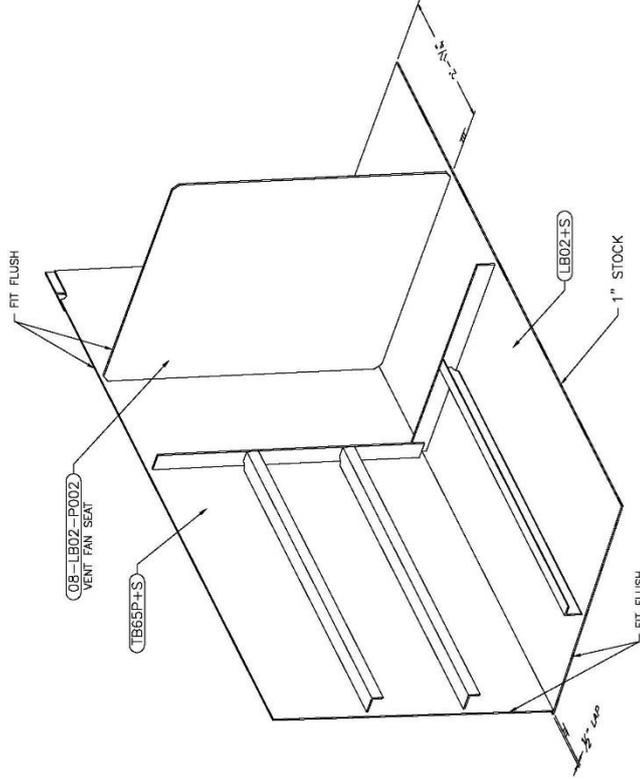
STRUCTURAL WELD:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

Weight: 400.26lb  
LCG: -129'-5 5/8"  
TCG: 14'-11 13/16"  
VCG: 16'-3 11/16"

VT02/TB65P+S		BHD FR 64.5 VENT TRUNK P	
SCALE	TYPING NO.	SCALE	TYPING NO.
B	U08-TB65P.dwg	NONE	180PB001-U08-839-001
SHEET 24		SHEET 24	

**BILL OF MATERIALS**

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
LB02+S	1	N/A	N/A	N/A	N/A	338.644	N/A
TB65P+S	1	N/A	N/A	N/A	N/A	400.259	N/A
08-LB02-P002	1	STEEL_0.3125	N/A	N/A	N/A	176.48	NT5_16-007



ISOMETRIC VIEW  
N.T.S.

STRUCTURAL CUT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

STRUCTURAL FIT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

STRUCTURAL WELD:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

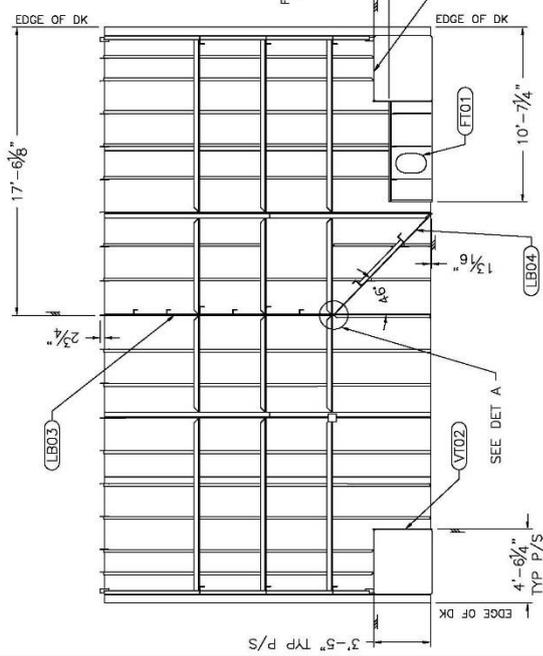
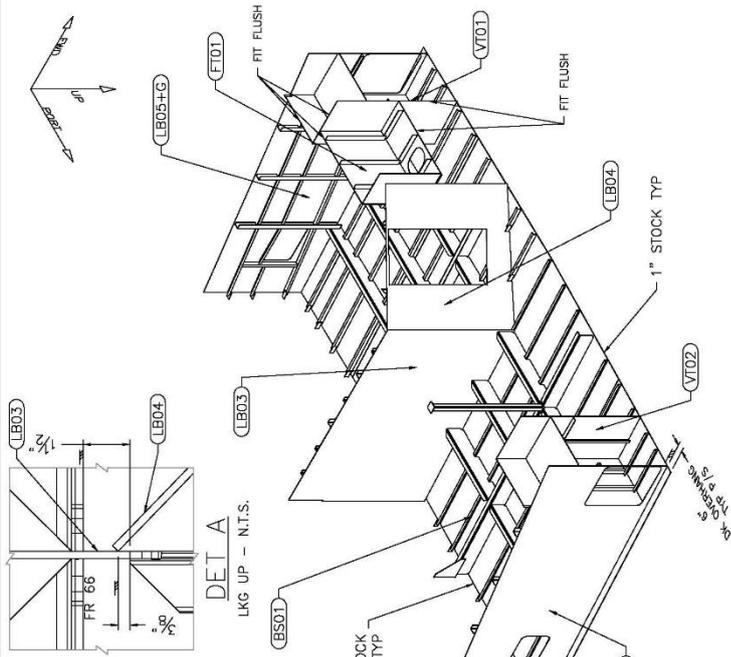
Weight: 915.38lb  
LCG: -128'-6 1/8"  
TCG: 14'-3"  
VCG: 15'-9 7/8"

RS	A
SCALE	NONE
UJOB	U08-VT02.dwg
PROJECT	180PB001-U08-839-001
SHEET	25

BS02/VT02  
VENT TRUNK P

**BILL OF MATERIALS**

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
BS01	1	N/A	N/A	N/A	N/A	10980.991	N/A
FT01	1	N/A	N/A	N/A	N/A	563.091	N/A
LB03	1	N/A	N/A	N/A	N/A	1767.867	N/A
LB04	1	N/A	N/A	N/A	N/A	721.148	N/A
LB05+G	1	N/A	N/A	N/A	N/A	1731.142	N/A
LB06+G	1	N/A	N/A	N/A	N/A	1731.142	N/A
VT01	1	N/A	N/A	N/A	N/A	915.379	N/A
VT02	1	N/A	N/A	N/A	N/A	915.383	N/A



**ISOMETRIC VIEW**

STRUCTURAL CUT: \_\_\_\_\_  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

**PLAN VIEW**  
 LKG UP - N.T.S.

Weight: 19346.14lb  
 LCG: -1.35'-0 13/16"  
 TCC: -4 1/2"  
 VCC: 18'-9 1/2"

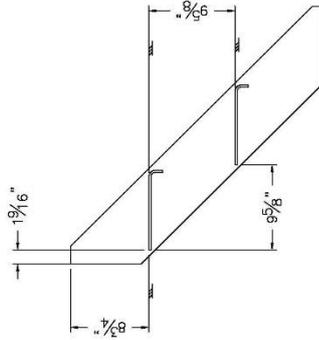
STRUCTURAL FIT: \_\_\_\_\_  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_  
 STRUCTURAL WELD: \_\_\_\_\_  
 STATUS: ACCEPTABLE / NOT ACCEPTABLE  
 INSPECTED BY: \_\_\_\_\_

BS03/BS02  
 BUILD STAGE 02  
 U08-BS02.dwg  
 NONE  
 180PB001-U08-839-001

SHEET 26

**BILL OF MATERIALS**

Part Name	Qty	Stock	Length (ft)	EC Start	EC End	WT (lb)	Nest
08-ST01-P001	2	STEEL_0.25	N/A	N/A	N/A	17.406	NT1_4-060
08-ST01-P002	2	STEEL_0.25_DIAMOND	N/A	N/A	N/A	29.488	NT1_4_DIAMOND-004



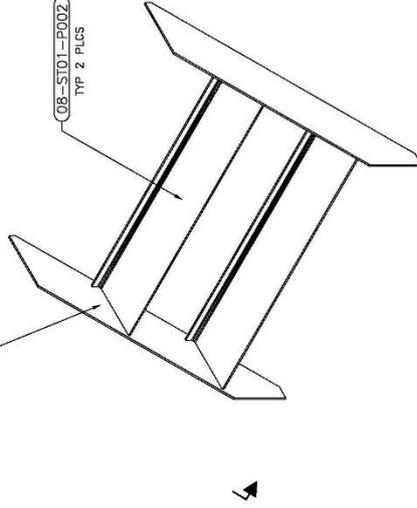
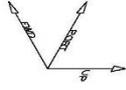
**SECTION VIEW A**

LKG AFT - N.T.S.



08-ST01-P001  
TYP 2 PLCS

08-ST01-P002  
TYP 2 PLCS



**ISOMETRIC VIEW**

N.T.S.

STRUCTURAL CUT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY:

STRUCTURAL FIT:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY:  
STRUCTURAL WELD:  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY:

Weight: 93.79lb  
LCG: -144'-11 15/16"  
TCG: 1'-9 1/8"  
VCG: 13'-0"

BS03/ST01  
AFT STAIRS

SCALE	NONE	180PB001-U08-839-001	SHEET 27
DATE	TITLE NO	U08-ST01.dwg	REV
B			A

**STRUCTURAL FIT:**  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

**STRUCTURAL WELD:**  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

**STRUCTURAL CUT:**  
STATUS: ACCEPTABLE / NOT ACCEPTABLE  
INSPECTED BY: \_\_\_\_\_

U08/BS03  
BUILD STAGE 03

U08-BS03.dwg

SCALE NONE | 180PB001-U08-839-001 | SHEET 28

BILL OF MATERIALS						
Part Name	Qty	Stock	Length (ft)	EC Start	EC End	Wt (lb)
BS02	1	N/A	N/A	N/A	N/A	19346.143
ST01	1	N/A	N/A	N/A	N/A	95.788
08-DK01-F001	1	FBBx1/4	19'-10" 5/16"	None	None	100.453
08-DK02-F001	1	FBBx1/4	19'-10" 5/16"	None	None	100.453
BKT095	6	STEEL_0.3125	N/A	N/A	N/A	1.191
						NT5_16-007

**DETAIL DET A**  
LKG AFT - N.T.S.

**ELEVATION VIEW**  
LKG PORT - N.T.S.

**ISOMETRIC VIEW**  
N.T.S.

Weight: 19647.98lb  
 LCG: -135'-1.7/16"  
 TCC: -4 5/16"  
 VCC: 18'-9 7/16"



**APPENDIX N**

ID No.	Assy Name	Part Name	Qty	Stock	Thickn ess (in)	Length (in)	EndCut Start	EndCut End	Part Weight (lbs)	Part Area (in^2) - One Side	Plate Nest Name	Part Nest Cut Length (in)	Part Flanged Length (in)
0.01	DK01+S/DK01	08-DK01-P002	1	STEEL 0.25	0.2500		N/A	N/A	1990.72	28081.47	NT1_4-062	714.20	
0.02	DK01+S/DK01	08-DK01-P001	1	STEEL 0.25	0.2500		N/A	N/A	1505.46	21236.19	NT1_4-054	656.20	
0.03	DK01+S/SP01	08-DK01-P004	1	SP MARKING 0.25			N/A	N/A	0.00	49376.71	NT_SPMARKING 1_4-001		
0.04	DK01+G/DK01+S	DK01	1	N/A			N/A	N/A	3496.181		N/A		
0.05	DK01+G/DK01+S	SP01	0	N/A			N/A	N/A	0.00		N/A		
0.06	DK01+G/DK01+S	08-DK01-S001	2	L3.0x2.0x.25	0.2500	40.466	none	none	13.46		N/A		
0.07	DK01+G/DK01+S	08-DK01-S002	1	L3.0x2.0x.25	0.2500	195.29	none	E079	65.18		N/A		
0.08	DK01+G/DK01+S	08-DK01-S003	4	FB3x1/4	0.2500	6	none	none	1.28		N/A		
0.09	DK01+G/DK01+S	08-DK01-S006	1	L3.0x2.0x.25	0.2500	43.128	none	E020	14.37		N/A		
0.10	DK01+G/DK01+S	08-DK01-S007	1	L3.0x2.0x.25	0.2500	187.203	none	none	62.64		N/A		
0.11	DK01+G/DK01+S	08-DK01-S008	1	L3.0x2.0x.25	0.2500	19.114	none	E020	6.34		N/A		
0.12	DK01+G/DK01+S	08-DK01-S009	1	L3.0x2.0x.25	0.2500	45.968	E079	none	15.22		N/A		
0.13	DK01+G/DK01+S	08-DK01-S010	1	L3.0x2.0x.25	0.2500	116.775	none	E079	38.91		N/A		
0.14	DK01+G/DK01+S	08-DK01-S011	7	FB3x1/4	0.2500	6	none	none	1.28		N/A		
0.15	DK01+G/DK01+S	08-DK01-S012	1	L3.0x2.0x.25	0.2500	236.256	none	none	79.05		N/A		
0.16	DK01+G/DK01+S	08-DK01-S014	1	L3.0x2.0x.25	0.2500	195.29	none	E079	65.18		N/A		
0.17	DK01+G/DK01+S	08-DK01-S016	1	L3.0x2.0x.25	0.2500	236.256	none	none	79.05		N/A		
0.18	DK01+G/DK01+S	08-DK01-S017	1	L3.0x2.0x.25	0.2500	236.256	none	none	79.05		N/A		
0.19	BS01/DK01+G	DK01+S	1	N/A			N/A	N/A	4042.13		N/A		
0.20	BS01/DK01+G	08-DK01-P003	1	STEEL 0.3125	0.3125		N/A	N/A	19.074	215.25	NT5_16-007	63.36	
0.21	BS01/DK01+G	08-DK01-P005	1	STEEL 0.375	0.3750		N/A	N/A	201.785	1887.01	NT3_8-008	272.52	119.60
0.22	BS01/DK01+G	08-DK01-P006	1	STEEL 0.375	0.3750		N/A	N/A	195.2	1826.63	NT3_8-008	263.89	116.54
0.23	BS01/DK01+G	08-DK01-P009	1	STEEL 0.375	0.3750		N/A	N/A	189.161	1769.04	NT3_8-008	306.91	125.76
0.24	BS01/DK01+G	08-DK01-P010	1	STEEL 0.375	0.3750		N/A	N/A	126.989	1190.66	NT3_8-008	182.05	70.86
0.25	BS01/DK01+G	08-DK01-P011	1	STEEL 0.375	0.3750		N/A	N/A	189.161	1769.04	NT3_8-008	306.91	125.76
0.26	BS01/DK01+G	08-DK01-P012	1	STEEL 0.375	0.3750		N/A	N/A	189.161	1769.04	NT3_8-008	306.91	125.76
0.27	BS01/DK01+G	08-DK01-P014	1	STEEL 0.375	0.3750		N/A	N/A	125.862	1180.05	NT3_8-008	187.82	70.86
0.28	BS01/DK01+G	08-DK01-P015	1	STEEL 0.375	0.3750		N/A	N/A	126.989	1190.66	NT3_8-008	182.05	70.86
0.29	DK02+S/DK02	08-DK02-P001	1	STEEL 0.25	0.2500		N/A	N/A	1990.749	28081.75	NT1_4-062	714.20	
0.30	DK02+S/DK02	08-DK02-P002	1	STEEL 0.25	0.2500		N/A	N/A	1538.949	21708.59	NT1_4-054	660.19	
0.31	DK02+S/SP02	08-DK02-P003	1	SP MARKING 0.25			N/A	N/A	0	49849.40	NT_SPMARKING 1_4-002		
0.32	DK02+G/DK02+S	DK02	1	N/A			N/A	N/A	3529.698		N/A		
0.33	DK02+G/DK02+S	SP02	0	N/A			N/A	N/A	0.00		N/A		
0.34	DK02+G/DK02+S	08-DK02-S001	7	FB3x1/4	0.2500	6	none	none	1.276		N/A		
0.35	DK02+G/DK02+S	08-DK02-S003	1	L3.0x2.0x.25	0.2500	236.328	E020	none	79.017		N/A		
0.36	DK02+G/DK02+S	08-DK02-S005	1	L3.0x2.0x.25	0.2500	236.329	E020	none	79.017		N/A		
0.37	DK02+G/DK02+S	08-DK02-S006	1	L3.0x2.0x.25	0.2500	236.331	E020	none	79.018		N/A		
0.38	DK02+G/DK02+S	08-DK02-S007	1	L3.0x2.0x.25	0.2500	236.328	E020	none	79.017		N/A		
0.39	DK02+G/DK02+S	08-DK02-S008	1	L3.0x2.0x.25	0.2500	69.529	E020	E079	23.054		N/A		
0.40	DK02+G/DK02+S	08-DK02-S009	1	L3.0x2.0x.25	0.2500	40.466	none	none	13.457		N/A		
0.41	DK02+G/DK02+S	08-DK02-S010	1	L3.0x2.0x.25	0.2500	40.466	none	none	13.457		N/A		
0.42	DK02+G/DK02+S	08-DK02-S011	1	L3.0x2.0x.25	0.2500	195.29	E079	none	65.184		N/A		
0.43	DK02+G/DK02+S	08-DK02-S012	1	L3.0x2.0x.25	0.2500	195.29	E079	none	65.184		N/A		
0.44	DK02+G/DK02+S	08-DK02-S013	1	L3.0x2.0x.25	0.2500	236.33	E020	none	79.018		N/A		
0.45	BS01/DK02+G	DK02+S	1	N/A			N/A	N/A	4114.05		N/A		

ID No.	Assy Name	Part Name	Qty	Stock	Thickn ess (in)	Length (in)	EndCut Start	EndCut End	Part Weight (lbs)	Part Area (in^2) - One Side	Plate Nest Name	Part Nest Cut Length (in)	Part Flanged Length (in)
0.46	BS01/DK02+G	08-DK02-P004	1	STEEL_0.375	0.3750		N/A	N/A	125.862	1180.06	NT3_8-008	187.82	70.86
0.47	BS01/DK02+G	08-DK02-P005	1	STEEL_0.375	0.3750		N/A	N/A	201.785	1887.01	NT3_8-008	272.52	119.60
0.48	BS01/DK02+G	08-DK02-P006	1	STEEL_0.3125	0.3125		N/A	N/A	19.074	215.25	NT5_16-007	63.36	
0.49	BS01/DK02+G	08-DK02-P007	1	STEEL_0.375	0.3750		N/A	N/A	125.862	1180.06	NT3_8-008	187.82	70.86
0.50	BS01/DK02+G	08-DK02-P008	1	STEEL_0.375	0.3750		N/A	N/A	125.862	1180.06	NT3_8-008	187.82	70.86
0.51	BS01/DK02+G	08-DK02-P009	1	STEEL_0.375	0.3750		N/A	N/A	195.899	1831.92	NT3_8-008	265.54	116.54
0.52	BS01/DK02+G	08-DK02-P013	1	STEEL_0.375	0.3750		N/A	N/A	189.16	1769.04	NT3_8-008	306.91	125.76
0.53	BS01/DK02+G	08-DK02-P016	1	STEEL_0.375	0.3750		N/A	N/A	189.16	1769.04	NT3_8-008	306.91	125.76
0.54	BS01/DK02+G	08-DK02-P018	1	STEEL_0.375	0.3750		N/A	N/A	189.16	1769.04	NT3_8-008	306.91	125.76
0.55	BS02/BS01	DK01+G	1	N/A			N/A	N/A	5405.52		N/A		
0.56	BS02/BS01	DK02+G	1	N/A			N/A	N/A	5475.88		N/A		
0.57	BS02/BS01	08-SN01-S015	1	ST4X4X0.25	0.2500	93.263	none	none	91.99		N/A		
0.58	BS02/BS01	BKT096	2	STEEL_0.375	0.3750		N/A	N/A	3.81	35.79	NT3_8-008	23.15	
0.59	FT01/FL01+S	08-FL01-P001	1	STEEL_0.25	0.2500		N/A	N/A	141.039	1989.52	NT1_4-060	270.77	
0.60	FT01/FL01+S	08-FL01-S002	3	FB4x1/4	0.2500	26.75	none	none	7.585		N/A		
0.61	FT01/TB64+S	08-TB64-P001	1	STEEL_0.25	0.2500		N/A	N/A	267.26	3770.00	NT1_4-058	249.00	
0.62	FT01/TB64+S	08-TB64-P027	1	STEEL_0.25	0.2500		N/A	N/A	109.669	1547.00	NT1_4-058	165.50	
0.63	FT01/TB64+S	08-TB64-S003	3	FB4x1/4	0.2500	50	none	E020	14.123		N/A		
0.64	BS02/FT01	FL01+S	1	N/A			N/A	N/A	163.80		N/A		
0.65	BS02/FT01	TB64+S	1	N/A			N/A	N/A	419.30		N/A		
0.66	BS02/LB03	08-LB03-P001	1	STEEL_0.25	0.2500		N/A	N/A	1340.437	18908.37	NT1_4-058	562.42	
0.67	BS02/LB03	08-LB03-S001	1	L4.0x3.0x.3125	0.3125	112.271	none	none	67.867		N/A		
0.68	BS02/LB03	08-LB03-S003	1	L4.0x3.0x.3125	0.3125	111.153	none	none	67.191		N/A		
0.69	BS02/LB03	08-LB03-S004	1	L6.0x3.5x.3125	0.3125	101.534	E042	none	81.931		N/A		
0.70	BS02/LB03	08-LB03-S005	1	L4.0x3.0x.3125	0.3125	108.915	none	none	65.838		N/A		
0.71	BS02/LB03	08-LB03-S006	1	L6.0x3.5x.3125	0.3125	99.297	E042	none	80.117		N/A		
0.72	BS02/LB03	08-LB03-S007	1	L4.0x3.0x.3125	0.3125	106.678	none	none	64.486		N/A		
0.73	BS02/LB04	08-LB04-P001	1	STEEL_0.25	0.2500		N/A	N/A	536.458	7567.35	NT1_4-060	662.58	
0.74	BS02/LB04	08-LB04-S001	1	L6.0x3.5x.3125	0.3125	103.132	none	E014	83.041		N/A		
0.75	BS02/LB04	08-LB04-S002	1	L6.0x3.5x.3125	0.3125	102.165	E014	none	82.257		N/A		
0.76	BS02/LB04	08-LB04-S003	1	L3.0x2.0x.25	0.2500	44	E079	E079	14.405		N/A		
0.77	BS02/LB04	08-LB04-S004	1	L3.0x2.0x.25	0.2500	15.649	E002	none	4.987		N/A		
0.78	BS02/LB05	08-LB05-P001	1	STEEL_0.25	0.2500		N/A	N/A	1342.711	18940.44	NT1_4-060	944.10	
0.79	BS02/LB05	08-LB05-S001	1	L6.0x3.5x.3125	0.3125	94.142	E013	none	73.413		N/A		
0.80	BS02/LB05	08-LB05-S002	1	L6.0x3.5x.3125	0.3125	90.481	E013	none	70.444		N/A		
0.81	BS02/LB05	08-LB05-S003	1	L6.0x3.5x.3125	0.3125	86.82	E013	none	68.4		N/A		
0.82	BS02/LB05	08-LB05-S004	1	L3.0x2.0x.1875	0.1875	39.75	none	none	10.086		N/A		
0.83	BS02/LB05	08-LB05-S005	1	L3.0x2.0x.1875	0.1875	193.262	none	none	49.037		N/A		
0.84	BS02/LB05	08-LB05-S006	1	L3.0x2.0x.1875	0.1875	123.389	none	none	31.255		N/A		
0.85	BS02/LB05	08-LB05-S007	1	L3.0x2.0x.1875	0.1875	193.247	none	none	49.033		N/A		
0.86	BS02/LB05	08-LB05-S008	1	L3.0x2.0x.1875	0.1875	47.227	E020	E020	11.854		N/A		
0.87	BS02/LB05	08-LB05-S009	1	L3.0x2.0x.1875	0.1875	30.062	none	E002	7.437		N/A		
0.88	BS02/LB05	08-LB05-S010	2	FB3x1/4	0.2500	6	none	none	1.276		N/A		
0.89	BS02/LB05	08-LB05-S011	4	FB3x1/4	0.2500	6	none	none	1.276		N/A		
0.90	BS02/LB05	08-LB05-S012	1	L3.0x2.0x.1875	0.1875	39	E020	E020	9.816		N/A		

ID No.	Assy Name	Part Name	Qty	Stock	Thickn ess (in)	Length (in)	EndCut Start	EndCut End	Part Weight (lbs)	Part Area (in^2) - One Side	Plate Nest Name	Part Nest Cut Length (in)	Part Flanged Length (in)
0.91	BS02/LB06	08-LB06-P001	1	STEEL_0.25	0.2500		N/A	N/A	1342.711	18940.44	NT1_4-058	944.10	
0.92	BS02/LB06	08-LB06-S001	1	L3.0x2.0x.1875	0.1875	123.389	none	none	31.255		N/A		
0.93	BS02/LB06	08-LB06-S002	1	L3.0x2.0x.1875	0.1875	193.262	none	none	49.037		N/A		
0.94	BS02/LB06	08-LB06-S003	1	L3.0x2.0x.1875	0.1875	39.75	none	none	10.086		N/A		
0.95	BS02/LB06	08-LB06-S004	1	L6.0x3.5x.3125	0.1875	94.142	none	E013	73.413		N/A		
0.96	BS02/LB06	08-LB06-S007	1	L3.0x2.0x.1875	0.1875	193.247	none	none	49.033		N/A		
0.97	BS02/LB06	08-LB06-S008	1	L3.0x2.0x.1875	0.1875	39	E020	E020	9.816		N/A		
0.98	BS02/LB06	08-LB06-S009	1	L3.0x2.0x.1875	0.1875	30.062	E002	none	7.437		N/A		
0.99	BS02/LB06	08-LB06-S010	2	FB3x1/4	0.2500	6	none	none	1.276		N/A		
1.00	BS02/LB06	08-LB06-S011	4	FB3x1/4	0.2500	6	none	none	1.276		N/A		
1.01	BS02/LB06	08-LB06-S012	1	L3.0x2.0x.1875	0.1875	47.227	E020	E020	11.854		N/A		
1.02	BS02/LB06	08-LB06-S013	1	L6.0x3.5x.3125	0.3125	90.481	none	E013	70.444		N/A		
1.03	BS02/LB06	08-LB06-S014	1	L6.0x3.5x.3125	0.3125	86.82	none	E013	68.4		N/A		
1.04	VT01/LB01	08-LB01-P001	1	STEEL_0.25	0.2500		N/A	N/A	309.217	4361.85	NT1_4-059	292.26	
1.05	VT01/LB01	08-LB01-S001	1	FB3x5/16	0.3125	39.751	none	none	10.567		N/A		
1.06	VT01/LB01	08-LB01-S002	1	L3.0x2.0x.25	0.2500	56.516	none	E020	18.856		N/A		
1.07	VT01/TB65S+S	08-TB65S-P001	1	STEEL_0.25	0.2500		N/A	N/A	348.401	4914.59	NT1_4-059	301.10	
1.08	VT01/TB65S+S	08-TB65S-P003	1	STEEL_0.25	0.2500		N/A	N/A	1.945	27.43	NT1_4-060	25.27	
1.09	VT01/TB65S+S	08-TB65S-S001	1	FB3x5/16	0.3125	45.75	none	none	12.162		N/A		
1.10	VT01/TB65S+S	08-TB65S-S002	1	L3.0x2.0x.25	0.2500	56.736	none	E020	18.93		N/A		
1.11	VT01/TB65S+S	08-TB65S-S003	1	L3.0x2.0x.25	0.2500	56.409	none	E020	18.821		N/A		
1.12	BS02/VT01	LB01	1	N/A			N/A	N/A	338.64		N/A		
1.13	BS02/VT01	TB65S+S	1	N/A			N/A	N/A	400.25		N/A		
1.14	BS02/VT01	08-LB01-P002	1	STEEL_0.3125	0.3125		N/A	N/A	176.48	1991.56	NT5_16-007	177.48	
1.15	VT02/LB02+S	08-LB02-P001	1	STEEL_0.25	0.2500		N/A	N/A	309.22	4361.90	NT1_4-060	292.26	
1.16	VT02/LB02+S	08-LB02-S001	1	FB3x5/16	0.3125	39.751	none	none	10.567		N/A		
1.17	VT02/LB02+S	08-LB02-S002	1	L3.0x2.0x.25	0.2500	56.516	E020	none	18.856		N/A		
1.18	VT02/TB65P+S	08-TB65P-P002	1	STEEL_0.25	0.2500		N/A	N/A	348.401	4914.59	NT1_4-060	301.10	
1.19	VT02/TB65P+S	08-TB65P-P003	1	STEEL_0.25	0.2500		N/A	N/A	1.945	27.434	NT1_4-060	25.27	
1.20	VT02/TB65P+S	08-TB65P-S001	1	FB3x5/16	0.3125	45.75	none	none	12.162		N/A		
1.21	VT02/TB65P+S	08-TB65P-S002	1	L3.0x2.0x.25	0.2500	56.409	E020	none	18.821		N/A		
1.22	VT02/TB65P+S	08-TB65P-S003	1	L3.0x2.0x.25	0.2500	56.736	E020	none	18.93		N/A		
1.23	BS02/VT02	LB02+S	1	N/A			N/A	N/A	338.64		N/A		
1.24	BS02/VT02	TB65P+S	1	N/A			N/A	N/A	400.25		N/A		
1.25	BS02/VT02	08-LB02-P002	1	STEEL_0.3125	0.3125		N/A	N/A	176.48	1991.56	NT5_16-007	177.48	
1.26	BS03/BS02	BS01	1	N/A			N/A	N/A	10980.991		N/A		
1.27	BS03/BS02	FT01	1	N/A			N/A	N/A	583.091		N/A		
1.28	BS03/BS02	LB03	1	N/A			N/A	N/A	1767.867		N/A		
1.29	BS03/BS02	LB04	1	N/A			N/A	N/A	721.148		N/A		
1.30	BS03/BS02	LB05	1	N/A			N/A	N/A	1730.690		N/A		
1.31	BS03/BS02	LB06	1	N/A			N/A	N/A	1730.690		N/A		
1.32	BS03/BS02	VT01	1	N/A			N/A	N/A	915.375		N/A		
1.33	BS03/BS02	VT02	1	N/A			N/A	N/A	915.38		N/A		
1.34	BS03/ST01	08-ST01-P001	2	STEEL_0.25	0.2500		N/A	N/A	17.406	245.53	NT1_4-060	86.47	
1.35	BS03/ST01	08-ST01-P002	2	STEEL_0.25_DIAMOND	0.2500		N/A	N/A	29.488	415.00	NT1_4 DIAMOND-004	103.00	41.50

ID No.	Assy Name	Part Name	Qty	Stock	Thickn ess (in)	Length (in)	EndCut Start	EndCut End	Part Weight (lbs)	Part Area (in^2) - One Side	Plate Nest Name	Part Nest Cut Length (in)	Part Flanged Length (in)
1.36	U08/BS03	BS02	1	N/A			N/A	N/A	19345,23		N/A		
1.37	U08/BS03	ST01	1	N/A			N/A	N/A	93.788		N/A		
1.38	U08/BS03	08-DK01-F001	1	FB6x1/4	0.2500	236.306	none	none	100.453		N/A		
1.39	U08/BS03	08-DK02-F001	1	FB6x1/4	0.2500	236.306	none	none	100.453		N/A		
1.40	U08/BS03	BKT095	6	STEEL_0.3125	0.3125		N/A	N/A	1.191	13.44	NT5_16-007	18.02	

ID No.	Assy Name	Part Name	Part Bevel Length (in)	Part Weld Length (in)	Part Nest Mark Length (in)	Is Flanged	Weld_Type_Side_1	Weld_Type_Side_2
0.01	DK01+S/DK01	08-DK01-P002		0	714.20	False	0	0
0.02	DK01+S/DK01	08-DK01-P001		238.2013	656.20	False	B_L_1_G_F_0.25	0
0.03	DK01+S/SP01	08-DK01-P004		0	894.49	False	0	0
0.04	DK01+G/DK01+S	DK01		0			0	0
0.05	DK01+G/DK01+S	SP01		0			0	0
0.06	DK01+G/DK01+S	08-DK01-S001		40.466			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.07	DK01+G/DK01+S	08-DK01-S002		195.29			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.08	DK01+G/DK01+S	08-DK01-S003		6			T_FLT_na_F_V_0.1875	T_FLT_na_F_V_0.1875
0.09	DK01+G/DK01+S	08-DK01-S006		43.128			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.10	DK01+G/DK01+S	08-DK01-S007		187.203			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.11	DK01+G/DK01+S	08-DK01-S008		19.114			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.12	DK01+G/DK01+S	08-DK01-S009		45.968			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.13	DK01+G/DK01+S	08-DK01-S010		116.775			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.14	DK01+G/DK01+S	08-DK01-S011		6			T_FLT_na_F_V_0.1875	T_FLT_na_F_V_0.1875
0.15	DK01+G/DK01+S	08-DK01-S012		236.256			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.16	DK01+G/DK01+S	08-DK01-S014		195.29			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.17	DK01+G/DK01+S	08-DK01-S016		236.256			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.18	DK01+G/DK01+S	08-DK01-S017		236.256			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.19	BS01/DK01+G	DK01+S		0			0	0
0.20	BS01/DK01+G	08-DK01-P003		16	63.36	False	L_FLT_na_F_H_0.25	L_FLT_na_F_H_0.25
0.21	BS01/DK01+G	08-DK01-P005		134.363	272.52	True	T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
0.22	BS01/DK01+G	08-DK01-P006		114.4702	263.89	True	T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
0.23	BS01/DK01+G	08-DK01-P009		114.4702	306.91	True	T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
0.24	BS01/DK01+G	08-DK01-P010		71.5012	182.05	True	T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
0.25	BS01/DK01+G	08-DK01-P011		126.9702	306.91	True	T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
0.26	BS01/DK01+G	08-DK01-P012		126.9702	306.91	True	T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
0.27	BS01/DK01+G	08-DK01-P014		84.0012	187.82	True	T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
0.28	BS01/DK01+G	08-DK01-P015		84.0012	182.05	True	T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
0.29	DK02+S/DK02	08-DK02-P001		0	714.20	False	0	0
0.30	DK02+S/DK02	08-DK02-P002		238.2023	660.19	False	B_L_1_G_F_0.25	0
0.31	DK02+S/SP02	08-DK02-P003		0	898.50	False	0	0
0.32	DK02+G/DK02+S	DK02		0			0	0
0.33	DK02+G/DK02+S	SP02		0			0	0
0.34	DK02+G/DK02+S	08-DK02-S001		6			T_FLT_na_F_V_0.1875	T_FLT_na_F_V_0.1875
0.35	DK02+G/DK02+S	08-DK02-S003		236.328			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.36	DK02+G/DK02+S	08-DK02-S005		236.329			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.37	DK02+G/DK02+S	08-DK02-S006		236.331			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.38	DK02+G/DK02+S	08-DK02-S007		236.328			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.39	DK02+G/DK02+S	08-DK02-S008		69.529			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.40	DK02+G/DK02+S	08-DK02-S009		40.466			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.41	DK02+G/DK02+S	08-DK02-S010		40.466			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.42	DK02+G/DK02+S	08-DK02-S011		195.29			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.43	DK02+G/DK02+S	08-DK02-S012		195.29			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.44	DK02+G/DK02+S	08-DK02-S013		236.33			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.45	BS01/DK02+G	DK02+S		0			0	0

ID No.	Assy Name	Part Name	Part Bevel Length (in)	Part Weld Length (in)	Part Nest Mark Length (in)	Is Flanged	Weld_Type_Side_1	Weld_Type_Side_2
0.46	BS01/DK02+G	08-DK02-P004		83.9987	187.82	True	T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
0.47	BS01/DK02+G	08-DK02-P005		130.6612	272.52	True	T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
0.48	BS01/DK02+G	08-DK02-P006		16	63.36	False	L_FLT_na_F_H_0.25	L_FLT_na_F_H_0.25
0.49	BS01/DK02+G	08-DK02-P007		83.9987	187.82	True	T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
0.50	BS01/DK02+G	08-DK02-P008		83.9987	187.82	True	T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
0.51	BS01/DK02+G	08-DK02-P009		114.4702	265.54	True	T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
0.52	BS01/DK02+G	08-DK02-P013		135.3152	306.91	True	T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
0.53	BS01/DK02+G	08-DK02-P016		135.3152	306.91	True	T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
0.54	BS01/DK02+G	08-DK02-P018		135.3152	306.91	True	T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
0.55	BS02/BS01	DK01+G		0			0	0
0.56	BS02/BS01	DK02+G		238.1605			B_L_1_G_F_0.25	0
0.57	BS02/BS01	08-SN01-S015		0			0	0
0.58	BS02/BS01	BKT096		16	23.15	False	T_FLT_na_F_H_0.1875	0
0.59	FT01/FL01+S	08-FL01-P001		0	270.77	False	0	0
0.60	FT01/FL01+S	08-FL01-S002		26.75			T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
0.61	FT01/TB64+S	08-TB64-P001		0	249.00	False	0	0
0.62	FT01/TB64+S	08-TB64-P027		52	165.50	False	T_FLT_na_F_H_0.1875	T_FLT_na_F_F_0.1875x2.5x10+4
0.63	FT01/TB64+S	08-TB64-S003		50			T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
0.64	BS02/FT01	FL01+S		103.75			T_FLT_na_F_H_0.1875	T_FLT_na_F_F_0.1875x2.5x10+4
0.65	BS02/FT01	TB64+S		0			0	0
0.66	BS02/LB03	08-LB03-P001		0	562.42	False	0	0
0.67	BS02/LB03	08-LB03-S001		112.271			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.68	BS02/LB03	08-LB03-S003		111.153			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.69	BS02/LB03	08-LB03-S004		101.534			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.70	BS02/LB03	08-LB03-S005		108.915			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.71	BS02/LB03	08-LB03-S006		99.297			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.72	BS02/LB03	08-LB03-S007		106.678			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.73	BS02/LB04	08-LB04-P001		0	662.58	False	0	0
0.74	BS02/LB04	08-LB04-S001		103.132			T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
0.75	BS02/LB04	08-LB04-S002		102.165			T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
0.76	BS02/LB04	08-LB04-S003		50			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.77	BS02/LB04	08-LB04-S004		18.649			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.78	BS02/LB05	08-LB05-P001		0	944.10	False	0	0
0.79	BS02/LB05	08-LB05-S001		94.142			T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
0.80	BS02/LB05	08-LB05-S002		90.481			T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
0.81	BS02/LB05	08-LB05-S003		86.82			T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
0.82	BS02/LB05	08-LB05-S004		39.75			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.83	BS02/LB05	08-LB05-S005		193.262			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.84	BS02/LB05	08-LB05-S006		123.389			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.85	BS02/LB05	08-LB05-S007		193.247			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.86	BS02/LB05	08-LB05-S008		53.227			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.87	BS02/LB05	08-LB05-S009		33.062			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.88	BS02/LB05	08-LB05-S010		6			T_FLT_na_F_V_0.1875	T_FLT_na_F_V_0.1875
0.89	BS02/LB05	08-LB05-S011		6			T_FLT_na_F_V_0.1875	T_FLT_na_F_V_0.1875
0.90	BS02/LB05	08-LB05-S012		45			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3

ID No.	Assy Name	Part Name	Part Bevel Length (in)	Part Weld Length (in)	Part Nest Mark Length (in)	Is Flanged	Weld_Type_Side_1	Weld_Type_Side_2
0.91	BS02/LB06	08-LB06-P001		0	944.10	False	0	0
0.92	BS02/LB06	08-LB06-S001		123.389			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.93	BS02/LB06	08-LB06-S002		193.262			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.94	BS02/LB06	08-LB06-S003		39.75			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.95	BS02/LB06	08-LB06-S004		94.142			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.96	BS02/LB06	08-LB06-S007		193.247			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.97	BS02/LB06	08-LB06-S008		45			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.98	BS02/LB06	08-LB06-S009		33.062			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
0.99	BS02/LB06	08-LB06-S010		6			T_FLT_na_F_V_0.1875	T_FLT_na_F_V_0.1875
1.00	BS02/LB06	08-LB06-S011		6			T_FLT_na_F_V_0.1875	T_FLT_na_F_V_0.1875
1.01	BS02/LB06	08-LB06-S012		53.227			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
1.02	BS02/LB06	08-LB06-S013		90.481			T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
1.03	BS02/LB06	08-LB06-S014		86.82			T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
1.04	VT01/LB01	08-LB01-P001		0	292.26	False	0	0
1.05	VT01/LB01	08-LB01-S001		39.751			T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
1.06	VT01/LB01	08-LB01-S002		59.516			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
1.07	VT01/TB65S+S	08-TB65S-P001		0	301.10	False	0	0
1.08	VT01/TB65S+S	08-TB65S-P003		10.6381	25.27	False	L_FLT_na_F_H_0.1875	L_FLT_na_F_H_0.1875
1.09	VT01/TB65S+S	08-TB65S-S001		45.75			T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
1.10	VT01/TB65S+S	08-TB65S-S002		59.736			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
1.11	VT01/TB65S+S	08-TB65S-S003		59.409			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
1.12	BS02/VT01	LB01		0			0	0
1.13	BS02/VT01	TB65S+S		103.59			T_FLT_na_F_F_0.1875	T_FLT_na_F_F_0.1875x2.5x10+4
1.14	BS02/VT01	08-LB01-P002		83.5	177.48	False	T_FLT_na_F_F_0.1875	T_FLT_na_F_F_0.1875x2.5x10+4
1.15	VT02/LB02+S	08-LB02-P001		0	292.26	False	0	0
1.16	VT02/LB02+S	08-LB02-S001		39.751			T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
1.17	VT02/LB02+S	08-LB02-S002		59.516			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
1.18	VT02/TB65P+S	08-TB65P-P002		0	301.10	False	0	0
1.19	VT02/TB65P+S	08-TB65P-P003		10.6381	25.27	False	L_FLT_na_F_H_0.1875	L_FLT_na_F_H_0.1875
1.20	VT02/TB65P+S	08-TB65P-S001		45.75			T_FLT_na_F_F_0.1875x2.5x10+4	T_FLT_na_F_F_0.1875x2.5x10+4
1.21	VT02/TB65P+S	08-TB65P-S002		59.409			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
1.22	VT02/TB65P+S	08-TB65P-S003		59.736			T_FLT_na_F_F_0.1875x2.5x12+3	T_FLT_na_F_F_0.1875x2.5x12+3
1.23	BS02/VT02	LB02+S		0			0	0
1.24	BS02/VT02	TB65P+S		103.59			T_FLT_na_F_F_0.1875	T_FLT_na_F_F_0.1875x2.5x10+4
1.25	BS02/VT02	08-LB02-P002		83.5	177.48	False	T_FLT_na_F_F_0.1875	T_FLT_na_F_F_0.1875x2.5x10+4
1.26	BS03/BS02	BS01		0			0	0
1.27	BS03/BS02	FT01		84			T_FLT_na_F_F_0.1875	T_FLT_na_F_F_0.1875x2.5x10+4
1.28	BS03/BS02	LB03		169.43			T_FLT_na_F_F_0.1875	T_FLT_na_F_F_0.1875x2.5x10+4
1.29	BS03/BS02	LB04		211.38			T_FLT_na_F_F_0.1875	T_FLT_na_F_F_0.1875x2.5x10+4
1.30	BS03/BS02	LB05		239.77			T_FLT_na_F_F_0.1875	T_FLT_na_F_F_0.1875x2.5x10+4
1.31	BS03/BS02	LB06		239.77			T_FLT_na_F_F_0.1875	T_FLT_na_F_F_0.1875x2.5x10+4
1.32	BS03/BS02	VT01		143.34			T_FLT_na_F_F_0.1875	T_FLT_na_F_F_0.1875x2.5x10+4
1.33	BS03/BS02	VT02		143.34			T_FLT_na_F_F_0.1875	T_FLT_na_F_F_0.1875x2.5x10+4
1.34	BS03/ST01	08-ST01-P001		0	86.47	False	0	0
1.35	BS03/ST01	08-ST01-P002		21	103.00	True	T_FLT_na_F_V_0.125	T_FLT_na_F_V_0.125

ID No.	Assy Name	Part Name	Part Bevel Length (in)	Part Weld Length (in)	Part Nest Mark Length (in)	Is Flanged	Weld_Type_Side_1	Weld_Type_Side_2
1.36	U08/BS03	BS02		0			0	0
1.37	U08/BS03	ST01		85.48			L FLT na F H 0.1875	0
1.38	U08/BS03	08-DK01-F001		236.306			T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875
1.39	U08/BS03	08-DK02-F001		236.306			T FLT na F F 0.1875x2.5x10+4	T FLT na F F 0.1875
1.40	U08/BS03	BKT095		6	18.02	False	T FLT na F V 0.125	T FLT na F V 0.125



**APPENDIX O**

ID No.	Assy Name	Part Name	Qty	Total_mhr_per_Part	PL_Cut_Time (min.)	PL_Mark_Time (min.)	PL_Handle_Time_to_Beveling_Station (min.)	PL_Bevel_Time (min.)	PL_Handle_Time_to_Assy_Station (min.)	PL_Fit_Time (min.)
0.01	DK01+S/DK01	08-DK01-P002	1	3	3.57	2.86			4.00	180.00
0.02	DK01+S/DK01	08-DK01-P001	1	3	3.28	2.62			4.00	180.00
0.03	DK01+S/SP01	08-DK01-P004	1	0						
0.04	DK01+G/DK01+S	DK01	1	4						
0.05	DK01+G/DK01+S	SP01	0	0						
0.06	DK01+G/DK01+S	08-DK01-S001	2	1						
0.07	DK01+G/DK01+S	08-DK01-S002	1	1						
0.08	DK01+G/DK01+S	08-DK01-S003	4	1						
0.09	DK01+G/DK01+S	08-DK01-S006	1	0						
0.10	DK01+G/DK01+S	08-DK01-S007	1	1						
0.11	DK01+G/DK01+S	08-DK01-S008	1	0						
0.12	DK01+G/DK01+S	08-DK01-S009	1	0						
0.13	DK01+G/DK01+S	08-DK01-S010	1	1						
0.14	DK01+G/DK01+S	08-DK01-S011	7	2						
0.15	DK01+G/DK01+S	08-DK01-S012	1	1						
0.16	DK01+G/DK01+S	08-DK01-S014	1	1						
0.17	DK01+G/DK01+S	08-DK01-S016	1	1						
0.18	DK01+G/DK01+S	08-DK01-S017	1	1						
0.19	BS01/DK01+G	DK01+S	1	4						
0.20	BS01/DK01+G	08-DK01-P003	1	1	0.36	0.25			2.00	70.00
0.21	BS01/DK01+G	08-DK01-P005	1	1	1.95	1.09				
0.22	BS01/DK01+G	08-DK01-P006	1	1	1.88	1.06				
0.23	BS01/DK01+G	08-DK01-P009	1	1	2.19	1.23				
0.24	BS01/DK01+G	08-DK01-P010	1	1	1.30	0.73				
0.25	BS01/DK01+G	08-DK01-P011	1	1	2.19	1.23				
0.26	BS01/DK01+G	08-DK01-P012	1	1	2.19	1.23				
0.27	BS01/DK01+G	08-DK01-P014	1	1	1.34	0.75				
0.28	BS01/DK01+G	08-DK01-P015	1	1	1.30	0.73				
0.29	DK02+S/DK02	08-DK02-P001	1	3	3.57	2.86			4.00	180.00
0.30	DK02+S/DK02	08-DK02-P002	1	3	3.30	2.64			4.00	180.00
0.31	DK02+S/SP02	08-DK02-P003	1	0						
0.32	DK02+G/DK02+S	DK02	1	4						
0.33	DK02+G/DK02+S	SP02	0	0						
0.34	DK02+G/DK02+S	08-DK02-S001	7	2						
0.35	DK02+G/DK02+S	08-DK02-S003	1	1						
0.36	DK02+G/DK02+S	08-DK02-S005	1	1						
0.37	DK02+G/DK02+S	08-DK02-S006	1	1						
0.38	DK02+G/DK02+S	08-DK02-S007	1	1						
0.39	DK02+G/DK02+S	08-DK02-S008	1	1						
0.40	DK02+G/DK02+S	08-DK02-S009	1	0						
0.41	DK02+G/DK02+S	08-DK02-S010	1	0						
0.42	DK02+G/DK02+S	08-DK02-S011	1	1						

ID No.	Assy Name	Part Name	Qty	Total_mhr_per_Part	PL_Cut_Time (min.)	PL_Mark_Time (min.)	PL_Handle_Time_t o_Beveling_Sta (min.)	PL_Bevel_Time (min.)	PL_Handle_Time_t o_Assy_Sta (min.)	PL_Fit_Time (min.)
0.43	DK02+G/DK02+S	08-DK02-S012	1	1						
0.44	DK02+G/DK02+S	08-DK02-S013	1	1						
0.45	BS01/DK02+G	DK02+S	1	4						
0.46	BS01/DK02+G	08-DK02-P004	1	1	1.34	0.75				
0.47	BS01/DK02+G	08-DK02-P005	1	1	1.95	1.09				
0.48	BS01/DK02+G	08-DK02-P006	1	1	0.36	0.25		2.00	70.00	
0.49	BS01/DK02+G	08-DK02-P007	1	1	1.34	0.75				
0.50	BS01/DK02+G	08-DK02-P008	1	1	1.34	0.75				
0.51	BS01/DK02+G	08-DK02-P009	1	1	1.90	1.06				
0.52	BS01/DK02+G	08-DK02-P013	1	1	2.19	1.23				
0.53	BS01/DK02+G	08-DK02-P016	1	1	2.19	1.23				
0.54	BS01/DK02+G	08-DK02-P018	1	1	2.19	1.23				
0.55	BS02/BS01	DK01+G	1	4						
0.56	BS02/BS01	DK02+G	1	4						
0.57	BS02/BS01	08-SN01-S015	1	0						
0.58	BS02/BS01	BKT096	2	3	0.33	0.19		4.00	140.00	
0.59	FT01/FL01+S	08-FL01-P001	1	1	1.35	1.08		4.00	70.00	
0.60	FT01/FL01+S	08-FL01-S002	3	1						
0.61	FT01/TB64+S	08-TB64-P001	1	1	1.25	1.00		4.00	70.00	
0.62	FT01/TB64+S	08-TB64-P027	1	2	0.83	0.66		4.00	70.00	
0.63	FT01/TB64+S	08-TB64-S003	3	1						
0.64	BS02/FT01	FL01+S	1	4						
0.65	BS02/FT01	TB64+S	1	3						
0.66	BS02/LB03	08-LB03-P001	1	3	2.81	2.25		4.00	180.00	
0.67	BS02/LB03	08-LB03-S001	1	1						
0.68	BS02/LB03	08-LB03-S003	1	1						
0.69	BS02/LB03	08-LB03-S004	1	1						
0.70	BS02/LB03	08-LB03-S005	1	1						
0.71	BS02/LB03	08-LB03-S006	1	1						
0.72	BS02/LB03	08-LB03-S007	1	1						
0.73	BS02/LB04	08-LB04-P001	1	3	3.31	2.65		4.00	180.00	
0.74	BS02/LB04	08-LB04-S001	1	1						
0.75	BS02/LB04	08-LB04-S002	1	1						
0.76	BS02/LB04	08-LB04-S003	1	0						
0.77	BS02/LB04	08-LB04-S004	1	0						
0.78	BS02/LB05	08-LB05-P001	1	3	4.72	3.78		4.00	180.00	
0.79	BS02/LB05	08-LB05-S001	1	1						
0.80	BS02/LB05	08-LB05-S002	1	1						
0.81	BS02/LB05	08-LB05-S003	1	1						
0.82	BS02/LB05	08-LB05-S004	1	0						
0.83	BS02/LB05	08-LB05-S005	1	1						
0.84	BS02/LB05	08-LB05-S006	1	1						

ID No.	Assy Name	Part Name	Qty	Total_mhr_per_Part	PL_Cut_Time (min.)	PL_Mark_Time (min.)	PL_Handle_Time_to_Beveling_Station (min.)	PL_Bevel_Time (min.)	PL_Handle_Time_to_Assy_Station (min.)	PL_Fit_Time (min.)
0.85	BS02/LB05	08-LB05-S007	1	1						
0.86	BS02/LB05	08-LB05-S008	1	0						
0.87	BS02/LB05	08-LB05-S009	1	0						
0.88	BS02/LB05	08-LB05-S010	2	0						
0.89	BS02/LB05	08-LB05-S011	4	1						
0.90	BS02/LB05	08-LB05-S012	1	0						
0.91	BS02/LB06	08-LB06-P001	1	3	4.72	3.78			4.00	180.00
0.92	BS02/LB06	08-LB06-S001	1	1						
0.93	BS02/LB06	08-LB06-S002	1	1						
0.94	BS02/LB06	08-LB06-S003	1	0						
0.95	BS02/LB06	08-LB06-S004	1	1						
0.96	BS02/LB06	08-LB06-S007	1	1						
0.97	BS02/LB06	08-LB06-S008	1	0						
0.98	BS02/LB06	08-LB06-S009	1	0						
0.99	BS02/LB06	08-LB06-S010	2	0						
1.00	BS02/LB06	08-LB06-S011	4	1						
1.01	BS02/LB06	08-LB06-S012	1	0						
1.02	BS02/LB06	08-LB06-S013	1	1						
1.03	BS02/LB06	08-LB06-S014	1	1						
1.04	VT01/LB01	08-LB01-P001	1	1	1.46	1.17			4.00	70.00
1.05	VT01/LB01	08-LB01-S001	1	0						
1.06	VT01/LB01	08-LB01-S002	1	0						
1.07	VT01/TB65S+S	08-TB65S-P001	1	1	1.51	1.20			4.00	70.00
1.08	VT01/TB65S+S	08-TB65S-P003	1	1	0.13	0.10			2.00	70.00
1.09	VT01/TB65S+S	08-TB65S-S001	1	0						
1.10	VT01/TB65S+S	08-TB65S-S002	1	0						
1.11	VT01/TB65S+S	08-TB65S-S003	1	0						
1.12	BS02/VT01	LB01	1	3						
1.13	BS02/VT01	TB65S+S	1	4						
1.14	BS02/VT01	08-LB01-P002	1	2	1.01	0.71			4.00	70.00
1.15	VT02/LB02+S	08-LB02-P001	1	1	1.46	1.17			4.00	70.00
1.16	VT02/LB02+S	08-LB02-S001	1	0						
1.17	VT02/LB02+S	08-LB02-S002	1	0						
1.18	VT02/TB65P+S	08-TB65P-P002	1	1	1.51	1.20			4.00	70.00
1.19	VT02/TB65P+S	08-TB65P-P003	1	1	0.13	0.10			2.00	70.00
1.20	VT02/TB65P+S	08-TB65P-S001	1	0						
1.21	VT02/TB65P+S	08-TB65P-S002	1	0						
1.22	VT02/TB65P+S	08-TB65P-S003	1	0						
1.23	BS02/VT02	LB02+S	1	3						
1.24	BS02/VT02	TB65P+S	1	4						
1.25	BS02/VT02	08-LB02-P002	1	2	1.01	0.71			4.00	70.00
1.26	BS03/BS02	BS01	1	5						

ID No.	Assy Name	Part Name	Qty	Total_mhr_per_Part	PL_Cut_Time (min.)	PL_Mark_Time (min.)	PL_Handle_Time_to_Beveling_Station (min.)	PL_Bevel_Time (min.)	PL_Handle_Time_to_Assy_Station (min.)	PL_Fit_Time (min.)
1.27	BS03/BS02	FT01	1	4						
1.28	BS03/BS02	LB03	1	5						
1.29	BS03/BS02	LB04	1	4						
1.30	BS03/BS02	LB05	1	5						
1.31	BS03/BS02	LB06	1	5						
1.32	BS03/BS02	VT01	1	4						
1.33	BS03/BS02	VT02	1	4						
1.34	BS03/ST01	08-ST01-P001	2	2	0.86	0.69			4	140
1.35	BS03/ST01	08-ST01-P002	2	1	1.03	0.82				
1.36	U08/BS03	BS02	1	5						
1.37	U08/BS03	ST01	1	3						
1.38	U08/BS03	08-DK01-F001	1	1						
1.39	U08/BS03	08-DK02-F001	1	1						
1.40	U08/BS03	BKT095	6	8	0.62	0.43			12	420

ID No.	Assy Name	Part Name	Qty	PL_Weld_Time_Side_1 (min.)	PL_Weld_Time_Side_2 (min.)	Profile_Cut_Time (min.)	Profile_Mark_Time (min.)	EndCut_Time_Start_Time (min.)	EndCut_Time_Finish_Time (min.)	Profile_Handle_Time_to_Assy_Sta (min.)	Profile_Fit_Time (min.)
0.01	DK01+S/DK01	08-DK01-P002	1	0.00							
0.02	DK01+S/DK01	08-DK01-P001	1	12.10							
0.03	DK01+S/SP01	08-DK01-P004	1								
0.04	DK01+G/DK01+S	DK01	1								
0.05	DK01+G/DK01+S	SP01	0								
0.06	DK01+G/DK01+S	08-DK01-S001	2			4	1			8.00	10.00
0.07	DK01+G/DK01+S	08-DK01-S002	1			2	0.5		5.00	8.00	9.00
0.08	DK01+G/DK01+S	08-DK01-S003	4			8	2			16.00	20.00
0.09	DK01+G/DK01+S	08-DK01-S006	1			2	0.5		5.00	4.00	5.00
0.10	DK01+G/DK01+S	08-DK01-S007	1			2	0.5			8.00	9.00
0.11	DK01+G/DK01+S	08-DK01-S008	1			2	0.5		5.00	4.00	5.00
0.12	DK01+G/DK01+S	08-DK01-S009	1			2	0.5	5.00		4.00	5.00
0.13	DK01+G/DK01+S	08-DK01-S010	1			2	0.5		5.00	4.00	5.00
0.14	DK01+G/DK01+S	08-DK01-S011	7			14	3.5			28.00	35.00
0.15	DK01+G/DK01+S	08-DK01-S012	1			2	0.5			8.00	9.00
0.16	DK01+G/DK01+S	08-DK01-S014	1			2	0.5		5.00	8.00	9.00
0.17	DK01+G/DK01+S	08-DK01-S016	1			2	0.5			8.00	9.00
0.18	DK01+G/DK01+S	08-DK01-S017	1			2	0.5			8.00	9.00
0.19	BS01/DK01+G	DK01+S	1								
0.20	BS01/DK01+G	08-DK01-P003	1	2.71	2.71						
0.21	BS01/DK01+G	08-DK01-P005	1								
0.22	BS01/DK01+G	08-DK01-P006	1								
0.23	BS01/DK01+G	08-DK01-P009	1								
0.24	BS01/DK01+G	08-DK01-P010	1								
0.25	BS01/DK01+G	08-DK01-P011	1								
0.26	BS01/DK01+G	08-DK01-P012	1								
0.27	BS01/DK01+G	08-DK01-P014	1								
0.28	BS01/DK01+G	08-DK01-P015	1								
0.29	DK02+S/DK02	08-DK02-P001	1	0.00							
0.30	DK02+S/DK02	08-DK02-P002	1	12.10							
0.31	DK02+S/SP02	08-DK02-P003	1								
0.32	DK02+G/DK02+S	DK02	1								
0.33	DK02+G/DK02+S	SP02	0								
0.34	DK02+G/DK02+S	08-DK02-S001	7			14	3.5			28.00	35.00
0.35	DK02+G/DK02+S	08-DK02-S003	1			2	0.5	5.00		8.00	9.00
0.36	DK02+G/DK02+S	08-DK02-S005	1			2	0.5	5.00		8.00	9.00
0.37	DK02+G/DK02+S	08-DK02-S006	1			2	0.5	5.00		8.00	9.00
0.38	DK02+G/DK02+S	08-DK02-S007	1			2	0.5	5.00		8.00	9.00
0.39	DK02+G/DK02+S	08-DK02-S008	1			2	0.5	5.00	5.00	4.00	5.00
0.40	DK02+G/DK02+S	08-DK02-S009	1			2	0.5			4.00	5.00
0.41	DK02+G/DK02+S	08-DK02-S010	1			2	0.5			4.00	5.00
0.42	DK02+G/DK02+S	08-DK02-S011	1			2	0.5	5.00		8.00	9.00

ID No.	Assy Name	Part Name	Qty	PL_Weld_Time_Side_1 (min.)	PL_Weld_Time_Side_2 (min.)	Profile_Cut_Time (min.)	Profile_Mark_Time (min.)	EndCut_Time_Start_Time (min.)	EndCut_Time_Finish_Time (min.)	Profile_Handle_Time_to_Assy_Sta (min.)	Profile_Fit_Time (min.)
0.43	DK02+G/DK02+S	08-DK02-S012	1			2	0.5	5.00		8.00	9.00
0.44	DK02+G/DK02+S	08-DK02-S013	1			2	0.5	5.00		8.00	9.00
0.45	BS01/DK02+G	DK02+S	1								
0.46	BS01/DK02+G	08-DK02-P004	1								
0.47	BS01/DK02+G	08-DK02-P005	1								
0.48	BS01/DK02+G	08-DK02-P006	1	2.71	2.71						
0.49	BS01/DK02+G	08-DK02-P007	1								
0.50	BS01/DK02+G	08-DK02-P008	1								
0.51	BS01/DK02+G	08-DK02-P009	1								
0.52	BS01/DK02+G	08-DK02-P013	1								
0.53	BS01/DK02+G	08-DK02-P016	1								
0.54	BS01/DK02+G	08-DK02-P018	1								
0.55	BS02/BS01	DK01+G	1								
0.56	BS02/BS01	DK02+G	1								
0.57	BS02/BS01	08-SN01-S015	1			2	0.5			8.00	5.00
0.58	BS02/BS01	BKT096	2	5.42							
0.59	FT01/FL01+S	08-FL01-P001	1	0.00							
0.60	FT01/FL01+S	08-FL01-S002	3			6	1.5			12.00	15.00
0.61	FT01/TB64+S	08-TB64-P001	1	0.00							
0.62	FT01/TB64+S	08-TB64-P027	1	8.81	6.60						
0.63	FT01/TB64+S	08-TB64-S003	3			6	1.5		15.00	12.00	15.00
0.64	BS02/FT01	FL01+S	1								
0.65	BS02/FT01	TB64+S	1								
0.66	BS02/LB03	08-LB03-P001	1	0.00							
0.67	BS02/LB03	08-LB03-S001	1			2	0.5			8.00	5.00
0.68	BS02/LB03	08-LB03-S003	1			2	0.5			8.00	5.00
0.69	BS02/LB03	08-LB03-S004	1			2	0.5	5.00		8.00	5.00
0.70	BS02/LB03	08-LB03-S005	1			2	0.5			8.00	5.00
0.71	BS02/LB03	08-LB03-S006	1			2	0.5	5.00		8.00	5.00
0.72	BS02/LB03	08-LB03-S007	1			2	0.5			8.00	5.00
0.73	BS02/LB04	08-LB04-P001	1	0.00							
0.74	BS02/LB04	08-LB04-S001	1			2	0.5		5.00	8.00	5.00
0.75	BS02/LB04	08-LB04-S002	1			2	0.5	5.00		8.00	5.00
0.76	BS02/LB04	08-LB04-S003	1			2	0.5	5.00	5.00	4.00	5.00
0.77	BS02/LB04	08-LB04-S004	1			2	0.5	5.00		4.00	5.00
0.78	BS02/LB05	08-LB05-P001	1	0.00							
0.79	BS02/LB05	08-LB05-S001	1			2	0.5	5.00		8.00	5.00
0.80	BS02/LB05	08-LB05-S002	1			2	0.5	5.00		8.00	5.00
0.81	BS02/LB05	08-LB05-S003	1			2	0.5	5.00		8.00	5.00
0.82	BS02/LB05	08-LB05-S004	1			2	0.5			4.00	5.00
0.83	BS02/LB05	08-LB05-S005	1			2	0.5			4.00	9.00
0.84	BS02/LB05	08-LB05-S006	1			2	0.5			4.00	9.00

ID No.	Assy Name	Part Name	Qty	PL_Weld_Time_Side_1 (min.)	PL_Weld_Time_Side_2 (min.)	Profile_Cut_Time (min.)	Profile_Mark_Time (min.)	EndCut_Time_Start_Time (min.)	EndCut_Time_Finish_Time (min.)	Profile_Handle_Time_to_Assy_Sta (min.)	Profile_Fit_Time (min.)
0.85	BS02/LB05	08-LB05-S007	1			2	0.5			4.00	9.00
0.86	BS02/LB05	08-LB05-S008	1			2	0.5	5.00	5.00	4.00	5.00
0.87	BS02/LB05	08-LB05-S009	1			2	0.5		5.00	4.00	5.00
0.88	BS02/LB05	08-LB05-S010	2			4	1			8.00	10.00
0.89	BS02/LB05	08-LB05-S011	4			8	2			16.00	20.00
0.90	BS02/LB05	08-LB05-S012	1			2	0.5	5.00	5.00	4.00	5.00
0.91	BS02/LB06	08-LB06-P001	1	0.00							
0.92	BS02/LB06	08-LB06-S001	1			2	0.5			4.00	9.00
0.93	BS02/LB06	08-LB06-S002	1			2	0.5			4.00	9.00
0.94	BS02/LB06	08-LB06-S003	1			2	0.5			4.00	5.00
0.95	BS02/LB06	08-LB06-S004	1			2	0.5		5.00	8.00	5.00
0.96	BS02/LB06	08-LB06-S007	1			2	0.5			4.00	9.00
0.97	BS02/LB06	08-LB06-S008	1			2	0.5	5.00	5.00	4.00	5.00
0.98	BS02/LB06	08-LB06-S009	1			2	0.5	5.00		4.00	5.00
0.99	BS02/LB06	08-LB06-S010	2			4	1			8.00	10.00
1.00	BS02/LB06	08-LB06-S011	4			8	2			16.00	20.00
1.01	BS02/LB06	08-LB06-S012	1			2	0.5	5.00	5.00	4.00	5.00
1.02	BS02/LB06	08-LB06-S013	1			2	0.5		5.00	8.00	5.00
1.03	BS02/LB06	08-LB06-S014	1			2	0.5		5.00	8.00	5.00
1.04	VT01/LB01	08-LB01-P001	1	0.00							
1.05	VT01/LB01	08-LB01-S001	1			2	0.5			4.00	5.00
1.06	VT01/LB01	08-LB01-S002	1			2	0.5		5.00	4.00	5.00
1.07	VT01/TB65S+S	08-TB65S-P001	1	0.00							
1.08	VT01/TB65S+S	08-TB65S-P003	1	1.80	1.80						
1.09	VT01/TB65S+S	08-TB65S-S001	1			2	0.5			4.00	5.00
1.10	VT01/TB65S+S	08-TB65S-S002	1			2	0.5		5.00	4.00	5.00
1.11	VT01/TB65S+S	08-TB65S-S003	1			2	0.5		5.00	4.00	5.00
1.12	BS02/VT01	LB01	1								
1.13	BS02/VT01	TB65S+S	1								
1.14	BS02/VT01	08-LB01-P002	1	10.60	10.60						
1.15	VT02/LB02+S	08-LB02-P001	1	0.00							
1.16	VT02/LB02+S	08-LB02-S001	1			2	0.5			4.00	5.00
1.17	VT02/LB02+S	08-LB02-S002	1			2	0.5	5.00		4.00	5.00
1.18	VT02/TB65P+S	08-TB65P-P002	1	0.00							
1.19	VT02/TB65P+S	08-TB65P-P003	1	1.80	1.80						
1.20	VT02/TB65P+S	08-TB65P-S001	1			2	0.5			4.00	5.00
1.21	VT02/TB65P+S	08-TB65P-S002	1			2	0.5	5.00		4.00	5.00
1.22	VT02/TB65P+S	08-TB65P-S003	1			2	0.5	5.00		4.00	5.00
1.23	BS02/VT02	LB02+S	1								
1.24	BS02/VT02	TB65P+S	1								
1.25	BS02/VT02	08-LB02-P002	1	10.60	10.60						
1.26	BS03/BS02	BS01	1								

ID No.	Assy Name	Part Name	Qty	PL_Weld_Time_Side_1 (min.)	PL_Weld_Time_Side_2 (min.)	Profile_Cut_Time (min.)	Profile_Mark_Time (min.)	EndCut_Time_Start_Time (min.)	EndCut_Time_Finish_Time (min.)	Profile_Handle_Time_to_Assy_Sta (min.)	Profile_Fit_Time (min.)
1.27	BS03/BS02	FT01	1								
1.28	BS03/BS02	LB03	1								
1.29	BS03/BS02	LB04	1								
1.30	BS03/BS02	LB05	1								
1.31	BS03/BS02	LB06	1								
1.32	BS03/BS02	VT01	1								
1.33	BS03/BS02	VT02	1								
1.34	BS03/ST01	08-ST01-P001	2	0							
1.35	BS03/ST01	08-ST01-P002	2								
1.36	U08/BS03	BS02	1								
1.37	U08/BS03	ST01	1								
1.38	U08/BS03	08-DK01-F001	1			2	0.5			8	9
1.39	U08/BS03	08-DK02-F001	1			2	0.5			8	9
1.40	U08/BS03	BKT095	6	9.14	9.14						

ID No.	Assy Name	Part Name	Qty	Profile_Weld_Time_Side_1 (min.)	Profile_Weld_Time_Side_2 (min.)	FP_Handle_Time_to_Flanging_Station (min.)	Flange_Time (min.)	FP_Handle_Time_to_Assembly_Station (min.)	FP_Fit_Time (min.)	FP_Weld_Time_Side_1 (min.)
0.01	DK01+S/DK01	08-DK01-P002	1							
0.02	DK01+S/DK01	08-DK01-P001	1							
0.03	DK01+S/SP01	08-DK01-P004	1							
0.04	DK01+G/DK01+S	DK01	1							
0.05	DK01+G/DK01+S	SP01	0							
0.06	DK01+G/DK01+S	08-DK01-S001	2	6.23	6.23					
0.07	DK01+G/DK01+S	08-DK01-S002	1	15.03	15.03					
0.08	DK01+G/DK01+S	08-DK01-S003	4	6.10	6.10					
0.09	DK01+G/DK01+S	08-DK01-S006	1	3.32	3.32					
0.10	DK01+G/DK01+S	08-DK01-S007	1	14.41	14.41					
0.11	DK01+G/DK01+S	08-DK01-S008	1	1.47	1.47					
0.12	DK01+G/DK01+S	08-DK01-S009	1	3.54	3.54					
0.13	DK01+G/DK01+S	08-DK01-S010	1	8.99	8.99					
0.14	DK01+G/DK01+S	08-DK01-S011	7	10.67	10.67					
0.15	DK01+G/DK01+S	08-DK01-S012	1	18.18	18.18					
0.16	DK01+G/DK01+S	08-DK01-S014	1	15.03	15.03					
0.17	DK01+G/DK01+S	08-DK01-S016	1	18.18	18.18					
0.18	DK01+G/DK01+S	08-DK01-S017	1	18.18	18.18					
0.19	BS01/DK01+G	DK01+S	1							
0.20	BS01/DK01+G	08-DK01-P003	1							
0.21	BS01/DK01+G	08-DK01-P005	1			4.00	5.00	4.00	20.00	17.06
0.22	BS01/DK01+G	08-DK01-P006	1			4.00	5.00	4.00	20.00	14.54
0.23	BS01/DK01+G	08-DK01-P009	1			4.00	10.00	4.00	25.00	14.54
0.24	BS01/DK01+G	08-DK01-P010	1			4.00	5.00	4.00	20.00	9.08
0.25	BS01/DK01+G	08-DK01-P011	1			4.00	10.00	4.00	25.00	16.13
0.26	BS01/DK01+G	08-DK01-P012	1			4.00	10.00	4.00	25.00	16.13
0.27	BS01/DK01+G	08-DK01-P014	1			4.00	5.00	4.00	20.00	10.67
0.28	BS01/DK01+G	08-DK01-P015	1			4.00	5.00	4.00	20.00	10.67
0.29	DK02+S/DK02	08-DK02-P001	1							
0.30	DK02+S/DK02	08-DK02-P002	1							
0.31	DK02+S/SP02	08-DK02-P003	1							
0.32	DK02+G/DK02+S	DK02	1							
0.33	DK02+G/DK02+S	SP02	0							
0.34	DK02+G/DK02+S	08-DK02-S001	7	10.67	10.67					
0.35	DK02+G/DK02+S	08-DK02-S003	1	18.19	18.19					
0.36	DK02+G/DK02+S	08-DK02-S005	1	18.19	18.19					
0.37	DK02+G/DK02+S	08-DK02-S006	1	18.19	18.19					
0.38	DK02+G/DK02+S	08-DK02-S007	1	18.19	18.19					
0.39	DK02+G/DK02+S	08-DK02-S008	1	5.35	5.35					
0.40	DK02+G/DK02+S	08-DK02-S009	1	3.11	3.11					
0.41	DK02+G/DK02+S	08-DK02-S010	1	3.11	3.11					
0.42	DK02+G/DK02+S	08-DK02-S011	1	15.03	15.03					

ID No.	Assy Name	Part Name	Qty	Profile_Weld_Time_Side_1 (min.)	Profile_Weld_Time_Side_2 (min.)	FP_Handle_Time_to_Flanging_Station (min.)	Flange_Time (min.)	FP_Handle_Time_to_Assembly_Station (min.)	FP_Fit_Time (min.)	FP_Weld_Time_Side_1 (min.)
0.43	DK02+G/DK02+S	08-DK02-S012	1	15.03	15.03					
0.44	DK02+G/DK02+S	08-DK02-S013	1	18.19	18.19					
0.45	BS01/DK02+G	DK02+S	1							
0.46	BS01/DK02+G	08-DK02-P004	1			4.00	5.00	4.00	20.00	10.67
0.47	BS01/DK02+G	08-DK02-P005	1			4.00	5.00	4.00	20.00	16.59
0.48	BS01/DK02+G	08-DK02-P006	1							
0.49	BS01/DK02+G	08-DK02-P007	1			4.00	5.00	4.00	20.00	10.67
0.50	BS01/DK02+G	08-DK02-P008	1			4.00	5.00	4.00	20.00	10.67
0.51	BS01/DK02+G	08-DK02-P009	1			4.00	5.00	4.00	20.00	14.54
0.52	BS01/DK02+G	08-DK02-P013	1			4.00	10.00	4.00	25.00	17.19
0.53	BS01/DK02+G	08-DK02-P016	1			4.00	10.00	4.00	25.00	17.19
0.54	BS01/DK02+G	08-DK02-P018	1			4.00	10.00	4.00	25.00	17.19
0.55	BS02/BS01	DK01+G	1							
0.56	BS02/BS01	DK02+G	1							
0.57	BS02/BS01	08-SN01-S015	1							
0.58	BS02/BS01	BKT096	2							
0.59	FT01/FL01+S	08-FL01-P001	1							
0.60	FT01/FL01+S	08-FL01-S002	3	10.19	10.19					
0.61	FT01/TB64+S	08-TB64-P001	1							
0.62	FT01/TB64+S	08-TB64-P027	1							
0.63	FT01/TB64+S	08-TB64-S003	3	19.05	19.05					
0.64	BS02/FT01	FL01+S	1							
0.65	BS02/FT01	TB64+S	1							
0.66	BS02/LB03	08-LB03-P001	1							
0.67	BS02/LB03	08-LB03-S001	1	8.64	8.64					
0.68	BS02/LB03	08-LB03-S003	1	8.56	8.56					
0.69	BS02/LB03	08-LB03-S004	1	7.82	7.82					
0.70	BS02/LB03	08-LB03-S005	1	8.38	8.38					
0.71	BS02/LB03	08-LB03-S006	1	7.64	7.64					
0.72	BS02/LB03	08-LB03-S007	1	8.21	8.21					
0.73	BS02/LB04	08-LB04-P001	1							
0.74	BS02/LB04	08-LB04-S001	1	13.10	13.10					
0.75	BS02/LB04	08-LB04-S002	1	12.97	12.97					
0.76	BS02/LB04	08-LB04-S003	1	3.39	3.39					
0.77	BS02/LB04	08-LB04-S004	1	1.20	1.20					
0.78	BS02/LB05	08-LB05-P001	1							
0.79	BS02/LB05	08-LB05-S001	1	11.96	11.96					
0.80	BS02/LB05	08-LB05-S002	1	11.49	11.49					
0.81	BS02/LB05	08-LB05-S003	1	11.03	11.03					
0.82	BS02/LB05	08-LB05-S004	1	3.06	3.06					
0.83	BS02/LB05	08-LB05-S005	1	14.88	14.88					
0.84	BS02/LB05	08-LB05-S006	1	9.50	9.50					

ID No.	Assy Name	Part Name	Qty	Profile_Weld_Time_Side_1 (min.)	Profile_Weld_Time_Side_2 (min.)	FP_Handle_Time_to_Flanging_Station (min.)	Flange_Time (min.)	FP_Handle_Time_to_Assembly_Station (min.)	FP_Fit_Time (min.)	FP_Weld_Time_Side_1 (min.)
0.85	BS02/LB05	08-LB05-S007	1	14.87	14.87					
0.86	BS02/LB05	08-LB05-S008	1	3.64	3.64					
0.87	BS02/LB05	08-LB05-S009	1	2.31	2.31					
0.88	BS02/LB05	08-LB05-S010	2	3.05	3.05					
0.89	BS02/LB05	08-LB05-S011	4	6.10	6.10					
0.90	BS02/LB05	08-LB05-S012	1	3.00	3.00					
0.91	BS02/LB06	08-LB06-P001	1							
0.92	BS02/LB06	08-LB06-S001	1	9.50	9.50					
0.93	BS02/LB06	08-LB06-S002	1	14.88	14.88					
0.94	BS02/LB06	08-LB06-S003	1	3.06	3.06					
0.95	BS02/LB06	08-LB06-S004	1	7.25	7.25					
0.96	BS02/LB06	08-LB06-S007	1	14.87	14.87					
0.97	BS02/LB06	08-LB06-S008	1	3.00	3.00					
0.98	BS02/LB06	08-LB06-S009	1	2.31	2.31					
0.99	BS02/LB06	08-LB06-S010	2	3.05	3.05					
1.00	BS02/LB06	08-LB06-S011	4	6.10	6.10					
1.01	BS02/LB06	08-LB06-S012	1	3.64	3.64					
1.02	BS02/LB06	08-LB06-S013	1	11.49	11.49					
1.03	BS02/LB06	08-LB06-S014	1	11.03	11.03					
1.04	VT01/LB01	08-LB01-P001	1							
1.05	VT01/LB01	08-LB01-S001	1	5.05	5.05					
1.06	VT01/LB01	08-LB01-S002	1	4.35	4.35					
1.07	VT01/TB65S+S	08-TB65S-P001	1							
1.08	VT01/TB65S+S	08-TB65S-P003	1							
1.09	VT01/TB65S+S	08-TB65S-S001	1	5.81	5.81					
1.10	VT01/TB65S+S	08-TB65S-S002	1	4.37	4.37					
1.11	VT01/TB65S+S	08-TB65S-S003	1	4.34	4.34					
1.12	BS02/VT01	LB01	1							
1.13	BS02/VT01	TB65S+S	1							
1.14	BS02/VT01	08-LB01-P002	1							
1.15	VT02/LB02+S	08-LB02-P001	1							
1.16	VT02/LB02+S	08-LB02-S001	1	5.05	5.05					
1.17	VT02/LB02+S	08-LB02-S002	1	4.35	4.35					
1.18	VT02/TB65P+S	08-TB65P-P002	1							
1.19	VT02/TB65P+S	08-TB65P-P003	1							
1.20	VT02/TB65P+S	08-TB65P-S001	1	5.81	5.81					
1.21	VT02/TB65P+S	08-TB65P-S002	1	4.34	4.34					
1.22	VT02/TB65P+S	08-TB65P-S003	1	4.37	4.37					
1.23	BS02/VT02	LB02+S	1							
1.24	BS02/VT02	TB65P+S	1							
1.25	BS02/VT02	08-LB02-P002	1							
1.26	BS03/BS02	BS01	1							

ID No.	Assy Name	Part Name	Qty	Profile_Weld_Time_Side_1 (min.)	Profile_Weld_Time_Side_2 (min.)	FP_Handle_Time_to_Flanging_Station (min.)	Flange_Time (min.)	FP_Handle_Time_to_Assembly_Station (min.)	FP_Fit_Time (min.)	FP_Weld_Time_Side_1 (min.)
1.27	BS03/BS02	FT01	1							
1.28	BS03/BS02	LB03	1							
1.29	BS03/BS02	LB04	1							
1.30	BS03/BS02	LB05	1							
1.31	BS03/BS02	LB06	1							
1.32	BS03/BS02	VT01	1							
1.33	BS03/BS02	VT02	1							
1.34	BS03/ST01	08-ST01-P001	2							
1.35	BS03/ST01	08-ST01-P002	2			4.00	4.00	4	30	10.668
1.36	U08/BS03	BS02	1							
1.37	U08/BS03	ST01	1							
1.38	U08/BS03	08-DK01-F001	1	30.01	30.01					
1.39	U08/BS03	08-DK02-F001	1	30.01	30.01					
1.40	U08/BS03	BKT095	6							

ID No.	Assy Name	Part Name	Qty	FP_Weld_Time_Side_2 (min.)	Panel_Handle_Time_to_Assembly_Sta (min.)	Panel_Fitup_Time (min.)	Panel_Weld_Time_Side_1 (min.)	Panel_Weld_Time_Side_2 (min.)	PL_Handle_Time_from_Bevel_Sta_to_Flanging_Sta (min.)
0.01	DK01+S/DK01	08-DK01-P002	1						
0.02	DK01+S/DK01	08-DK01-P001	1						
0.03	DK01+S/SP01	08-DK01-P004	1						
0.04	DK01+G/DK01+S	DK01	1		10.00	240.00			
0.05	DK01+G/DK01+S	SP01	0		0.00				
0.06	DK01+G/DK01+S	08-DK01-S001	2						
0.07	DK01+G/DK01+S	08-DK01-S002	1						
0.08	DK01+G/DK01+S	08-DK01-S003	4						
0.09	DK01+G/DK01+S	08-DK01-S006	1						
0.10	DK01+G/DK01+S	08-DK01-S007	1						
0.11	DK01+G/DK01+S	08-DK01-S008	1						
0.12	DK01+G/DK01+S	08-DK01-S009	1						
0.13	DK01+G/DK01+S	08-DK01-S010	1						
0.14	DK01+G/DK01+S	08-DK01-S011	7						
0.15	DK01+G/DK01+S	08-DK01-S012	1						
0.16	DK01+G/DK01+S	08-DK01-S014	1						
0.17	DK01+G/DK01+S	08-DK01-S016	1						
0.18	DK01+G/DK01+S	08-DK01-S017	1						
0.19	BS01/DK01+G	DK01+S	1		10.00	240.00			
0.20	BS01/DK01+G	08-DK01-P003	1						
0.21	BS01/DK01+G	08-DK01-P005	1	17.06					
0.22	BS01/DK01+G	08-DK01-P006	1	14.54					
0.23	BS01/DK01+G	08-DK01-P009	1	14.54					
0.24	BS01/DK01+G	08-DK01-P010	1	9.08					
0.25	BS01/DK01+G	08-DK01-P011	1	16.13					
0.26	BS01/DK01+G	08-DK01-P012	1	16.13					
0.27	BS01/DK01+G	08-DK01-P014	1	10.67					
0.28	BS01/DK01+G	08-DK01-P015	1	10.67					
0.29	DK02+S/DK02	08-DK02-P001	1						
0.30	DK02+S/DK02	08-DK02-P002	1						
0.31	DK02+S/SP02	08-DK02-P003	1						
0.32	DK02+G/DK02+S	DK02	1		10.00	240.00			
0.33	DK02+G/DK02+S	SP02	0		0.00				
0.34	DK02+G/DK02+S	08-DK02-S001	7						
0.35	DK02+G/DK02+S	08-DK02-S003	1						
0.36	DK02+G/DK02+S	08-DK02-S005	1						
0.37	DK02+G/DK02+S	08-DK02-S006	1						
0.38	DK02+G/DK02+S	08-DK02-S007	1						
0.39	DK02+G/DK02+S	08-DK02-S008	1						
0.40	DK02+G/DK02+S	08-DK02-S009	1						
0.41	DK02+G/DK02+S	08-DK02-S010	1						
0.42	DK02+G/DK02+S	08-DK02-S011	1						

ID No.	Assy Name	Part Name	Qty	FP_Weld_Time_Side_2 (min.)	Panel_Handle_Time_to_Assembly_Sta (min.)	Panel_Fitup_Time (min.)	Panel_Weld_Time_Side_1 (min.)	Panel_Weld_Time_Side_2 (min.)	PL_Handle_Time_from_Bevel_Sta_to_Flanging_Sta (min.)
0.43	DK02+G/DK02+S	08-DK02-S012	1						
0.44	DK02+G/DK02+S	08-DK02-S013	1						
0.45	BS01/DK02+G	DK02+S	1		10.00	240.00			
0.46	BS01/DK02+G	08-DK02-P004	1	10.67					
0.47	BS01/DK02+G	08-DK02-P005	1	16.59					
0.48	BS01/DK02+G	08-DK02-P006	1						
0.49	BS01/DK02+G	08-DK02-P007	1	10.67					
0.50	BS01/DK02+G	08-DK02-P008	1	10.67					
0.51	BS01/DK02+G	08-DK02-P009	1	14.54					
0.52	BS01/DK02+G	08-DK02-P013	1	17.19					
0.53	BS01/DK02+G	08-DK02-P016	1	17.19					
0.54	BS01/DK02+G	08-DK02-P018	1	17.19					
0.55	BS02/BS01	DK01+G	1		10.00	240.00			
0.56	BS02/BS01	DK02+G	1		10.00	240.00	12.10		
0.57	BS02/BS01	08-SN01-S015	1						
0.58	BS02/BS01	BKT096	2						
0.59	FT01/FL01+S	08-FL01-P001	1						
0.60	FT01/FL01+S	08-FL01-S002	3						
0.61	FT01/TB64+S	08-TB64-P001	1						
0.62	FT01/TB64+S	08-TB64-P027	1						
0.63	FT01/TB64+S	08-TB64-S003	3						
0.64	BS02/FT01	FL01+S	1		10.00	180.00	17.57	13.18	
0.65	BS02/FT01	TB64+S	1		10.00	180.00			
0.66	BS02/LB03	08-LB03-P001	1						
0.67	BS02/LB03	08-LB03-S001	1						
0.68	BS02/LB03	08-LB03-S003	1						
0.69	BS02/LB03	08-LB03-S004	1						
0.70	BS02/LB03	08-LB03-S005	1						
0.71	BS02/LB03	08-LB03-S006	1						
0.72	BS02/LB03	08-LB03-S007	1						
0.73	BS02/LB04	08-LB04-P001	1						
0.74	BS02/LB04	08-LB04-S001	1						
0.75	BS02/LB04	08-LB04-S002	1						
0.76	BS02/LB04	08-LB04-S003	1						
0.77	BS02/LB04	08-LB04-S004	1						
0.78	BS02/LB05	08-LB05-P001	1						
0.79	BS02/LB05	08-LB05-S001	1						
0.80	BS02/LB05	08-LB05-S002	1						
0.81	BS02/LB05	08-LB05-S003	1						
0.82	BS02/LB05	08-LB05-S004	1						
0.83	BS02/LB05	08-LB05-S005	1						
0.84	BS02/LB05	08-LB05-S006	1						

ID No.	Assy Name	Part Name	Qty	FP_Weld_Time_Side_2 (min.)	Panel_Handle_Time_to_Assembly_Sta (min.)	Panel_Fitup_Time (min.)	Panel_Weld_Time_Side_1 (min.)	Panel_Weld_Time_Side_2 (min.)	PL_Handle_Time_from_Bevel_Sta_to_Flanging_Sta (min.)
0.85	BS02/LB05	08-LB05-S007	1						
0.86	BS02/LB05	08-LB05-S008	1						
0.87	BS02/LB05	08-LB05-S009	1						
0.88	BS02/LB05	08-LB05-S010	2						
0.89	BS02/LB05	08-LB05-S011	4						
0.90	BS02/LB05	08-LB05-S012	1						
0.91	BS02/LB06	08-LB06-P001	1						
0.92	BS02/LB06	08-LB06-S001	1						
0.93	BS02/LB06	08-LB06-S002	1						
0.94	BS02/LB06	08-LB06-S003	1						
0.95	BS02/LB06	08-LB06-S004	1						
0.96	BS02/LB06	08-LB06-S007	1						
0.97	BS02/LB06	08-LB06-S008	1						
0.98	BS02/LB06	08-LB06-S009	1						
0.99	BS02/LB06	08-LB06-S010	2						
1.00	BS02/LB06	08-LB06-S011	4						
1.01	BS02/LB06	08-LB06-S012	1						
1.02	BS02/LB06	08-LB06-S013	1						
1.03	BS02/LB06	08-LB06-S014	1						
1.04	VT01/LB01	08-LB01-P001	1						
1.05	VT01/LB01	08-LB01-S001	1						
1.06	VT01/LB01	08-LB01-S002	1						
1.07	VT01/TB65S+S	08-TB65S-P001	1						
1.08	VT01/TB65S+S	08-TB65S-P003	1						
1.09	VT01/TB65S+S	08-TB65S-S001	1						
1.10	VT01/TB65S+S	08-TB65S-S002	1						
1.11	VT01/TB65S+S	08-TB65S-S003	1						
1.12	BS02/VT01	LB01	1		10.00	180.00			
1.13	BS02/VT01	TB65S+S	1		10.00	180.00	13.16	13.16	
1.14	BS02/VT01	08-LB01-P002	1						
1.15	VT02/LB02+S	08-LB02-P001	1						
1.16	VT02/LB02+S	08-LB02-S001	1						
1.17	VT02/LB02+S	08-LB02-S002	1						
1.18	VT02/TB65P+S	08-TB65P-P002	1						
1.19	VT02/TB65P+S	08-TB65P-P003	1						
1.20	VT02/TB65P+S	08-TB65P-S001	1						
1.21	VT02/TB65P+S	08-TB65P-S002	1						
1.22	VT02/TB65P+S	08-TB65P-S003	1						
1.23	BS02/VT02	LB02+S	1		10.00	180.00			
1.24	BS02/VT02	TB65P+S	1		10.00	180.00	13.16	13.16	
1.25	BS02/VT02	08-LB02-P002	1						
1.26	BS03/BS02	BS01	1		10.00	300.00			

<b>ID No.</b>	<b>Assy Name</b>	<b>Part Name</b>	<b>Qty</b>	<b>FP_Weld_Time_Side_2 (min.)</b>	<b>Panel_Handle_Time_to_Assembly_Sta (min.)</b>	<b>Panel_Fitup_Time (min.)</b>	<b>Panel_Weld_Time_Side_1 (min.)</b>	<b>Panel_Weld_Time_Side_2 (min.)</b>	<b>PL_Handle_Time_from_Bevel_Sta_to_Flanging_Sta (min.)</b>
1.27	BS03/BS02	FT01	1		10.00	180.00	10.67	10.67	
1.28	BS03/BS02	LB03	1		10.00	240.00	21.52	21.52	
1.29	BS03/BS02	LB04	1		10.00	180.00	26.85	26.85	
1.30	BS03/BS02	LB05	1		10.00	240.00	30.45	30.45	
1.31	BS03/BS02	LB06	1		10.00	240.00	30.45	30.45	
1.32	BS03/BS02	VT01	1		10.00	180.00	18.20	18.20	
1.33	BS03/BS02	VT02	1		10.00	180.00	18.20	18.20	
1.34	BS03/ST01	08-ST01-P001	2						
1.35	BS03/ST01	08-ST01-P002	2	10.668					
1.36	U08/BS03	BS02	1		10.00	300.00			
1.37	U08/BS03	ST01	1		10.00	180.00	14.47		
1.38	U08/BS03	08-DK01-F001	1						
1.39	U08/BS03	08-DK02-F001	1						
1.40	U08/BS03	BKT095	6						



## **APPENDIX P**

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- Hekkenberg, Robert G.; Hopman Hans** (2015), New Estimation Methods for the Steel Weight of European Inland Dry Bulk Ships



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**B.Sc.:** Naval Architecture and Ocean Engineering,  
Istanbul Technical University, Istanbul, Turkey  
1995

**M.Sc. :** Engineering Management, University of New  
Orleans, New Orleans, Louisiana, USA, 1998

### **PROFESSIONAL EXPERIENCE AND AWARDS:**

**2002 - Present** Ship Architects, Inc., Alabama, USA

As Senior Naval Architect and Operations Manager: Responsible for all engineering and design of vessels, including structure, hydrodynamics, strength of materials, regulatory compliance and production detail design.

Responsible for project scheduling and resource management. Coordinates all proposal submittals. Coordinates all regulatory submittals.

**1998 – 2002                      Alaska Ship and Drydock, Inc., Alaska, USA**

As Lead Estimator and Assistant Project Manager: Responsible for preparing all bid and proposal cost estimates for numerous USCG, AMHS, US Army, NOAA, US Forest Service, and commercial fishing vessels.

Responsible for project time and resource scheduling. Performed basic naval architecture, engineering liaison, and computer-aided drafting tasks for all repair and new construction projects. Planned, implemented and coordinated all weight control plans for numerous major SOLAS related alteration projects.

**1997-1998                      University of New Orleans, Louisiana, USA**

As an Engineering Research Assistant: Participated in research related activities at the Gulf Coast Region Maritime Technology Center for the Reliability, Availability and Maintainability (RAM) Database of Ship Operations Cooperative Program.

**1995–1996                      Istanbul Technical University, Istanbul, Turkey**

As an Engineering Research Assistant: Participated in the implementation of the ISM Code projects for numerous vessels in the Turkish Maritime Lines fleet as a member of the Bridge Operations team.

**PUBLICATIONS, PRESENTATIONS, AND PATENTS ON THE THESIS:**

Dr. Robert Latorre, Mr. Joe Comer, Mr. Altug Basaran, Mr. Josh Trippi, “Improved Estimation of Ship Construction Completion by RFID Tags” at 2013 Society of Naval Architects and Marine Engineers, Annual Meeting and Expo, November 6-8, 2013 Bellevue, Washington, USA.

**MEMBERSHIPS:**

2011 – Present                      Industry Advisory Board of the School of Naval Architecture  
and Marine Engineering at the University of New Orleans

2001 – Present                      Society of Naval Architects and Marine Engineers