

**CAMSPAN GALLERY
CONVEYORS
INSTALLATION & ERECTION
GUIDELINES**

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I. INTRODUCTION

The information contained in this volume will aid you in determining costs and requirements for erecting CamSpan Gallery Conveyor Systems. It should not be considered to be the final, definitive word on the subject of CamSpan Gallery Conveyor installation and erection, however. As gallery housing sizes and weights vary, according to conveyor belt width requirements, and as gallery free-span length requirements change, so will your site-specific conditions and situations affect lifting equipment and man-hour requirements. Your site-specific conditions **must** be considered, as you review and consider the information contained in these guidelines. Then, you will be able to determine, as closely as possible, the costs of erecting your CamSpan Gallery Conveyor system.

II. CONDITION OF CAMSPAN GALLERIES, AT DELIVERY

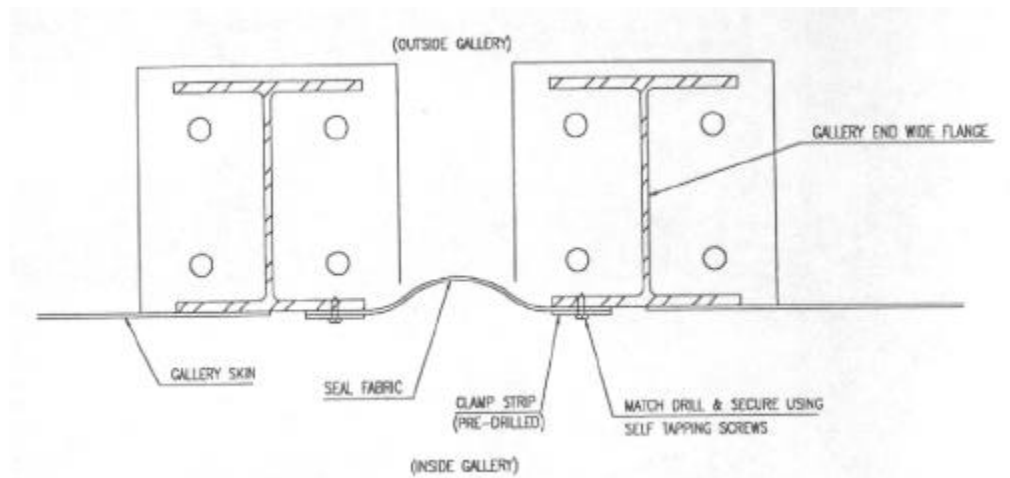
- A. The standard span length of CamSpan Gallery Conveyors is 120'-0". In order, therefore, to provide our customers with the most simple equipment erection requirements possible, CamSpan Gallery Conveyor modules are fabricated in 60'-0" weldments. Depending upon the span length requirements for specific jobs, there may be some shorter lengths shipped; but generally, the most commonly shipped gallery module length will be 60'-0".
- B. The typical 60'-0" section will include a bolt flange on one end, and a special "rolled wide flange" end on the other. The wide flange end (shaped like an upside-down "U"), will have base plates on the bottom, for connection to the corbel shoe; which, in turn, bolts to the support bent(s). The bolt flange end of each gallery section will bolt to the adjacent 60'-0" section. **Every** bolted flange will have been tested and fit at Cambelt's shops, eliminating **any** requirement for field drilling and/or reaming of flange holes when assembling CamSpan Gallery sections. All bolt flanges are match-marked, to ensure proper erection sequence. The marks will correspond to the flange markings shown on the erection drawing(s), provided by Cambelt. Only one (1) bolted flange per span of CamSpan Gallery is required, to make up the standard 120'-0" span. **Bolt tightening sequence and torque requirements for completing the connection are critical, and will be explained in greater detail, later in this volume.**
- C. Some CamSpan Gallery sections may include special design modifications such as

beveled or skewed ends, to match the building steel, where the galleries enter or exit buildings or towers. Concave or convex radii in the belt conveyor, inside the gallery, may also result in gallery modifications, to suit. Please refer to your general arrangement or proposal drawings, to evaluate the possibility for, and nature of any modified sections. Normally, unless **radical** changes are called for in the design, the "modified" sections will not significantly change the erection sequence or procedures; but they may need to be handled and stored differently, and could cause a particular span to contain more than one (1) bolted flange.

- D. Erection drawings, showing the general arrangement of the conveyor galleries, are provided with each job. These drawings show the shipping and erection markings of each major system component. All equipment shipped to the site will be identified in accordance with the marks shown on the erection drawings.
- E. CamSpan Gallery Conveyors arrive at the job site painted per the job specifications and will be assembled with conveyor tables and idlers already installed, unless job specifications require otherwise.
- F. Inlet sections and conveyor pulley terminals (if provided by Cambelt) will be pre-assembled, so far as the idlers, pulleys, shafts, bearings and skirtboards are concerned, and shipped to the job site for modular installation (unless indicated otherwise on the drawings). Most often, auxiliary safety devices such as safety pull switches, belt alignment switches, motion switches, etc., are also pre-mounted on the conveyor framework, prior to shipment of the CamSpan Gallery modules from Cambelt's shops in Salt Lake City. Drive equipment is normally assembled by Cambelt, to assure proper fit of the drive's components, but then it is disassembled and the various drive components (motor, gearbox, sheaves, belts, belt guards, etc.) are packed in a wooden crate, for on-site re-assembly and installation.
- G. Vertical Gravity Take-up sections (if required) are shipped with the bend pulley/shaft/bearing assemblies mounted in place, inside the CamSpan Gallery, at the location at which the return-side belt drops down through the floor, to the take-up assembly. The safety cage, guide assembly, counterweight box, etc., are shipped separately on pallets or in wooden crates, and will require on-site assembly, after erection of the CamSpan Gallery modules. Cambelt International provides the counterweight box, but the weight medium itself is provided by the erector. The weight medium may be steel punchings, steel plates, concrete, or whatever material the erector may deem appropriate. The amount of weight to be added to the counterweight box will be determined and specified by Cambelt

International.

- H. If the job calls for open stringer sections of the conveyor, such as heads, tails or vertical gravity take-up sections to be supplied, located outside of the CamSpan Gallery Conveyor enclosures, these pieces will generally be shipped painted and assembled, except for special switches and drive equipment.
- I. Cambelt's scope of supply normally includes the corbel shoe connectors that link one span with another, and provide for their common support to each customer-supplied support bent. One (1) end of each span is equipped with a set of low-friction, sliding expansion plates (sandwiched between the corbel shoe[s] and the rolled wide flange base plates), to allow for thermal expansion and contraction of the CamSpan Gallery.
- J. Assembly bolts, nuts, washers and other miscellaneous hardware are normally supplied to connect all components of Cambelt supplied equipment. Cambelt's supply of these items does not include those required at the interface point with customer-supplied items.
- K. Cambelt will supply materials for the installation of a gallery-to-gallery closure at the expansion joints, where one conveyor span meets another. This **usually** occurs directly above each support bent. Materials include a floor plate, wide enough to cover the gap in the floor between spans, and enough rubberized fabric (wider than necessary) to cover the same gap as it extends up the sides and overhead, around the circular roof. These items are all installed from **inside** the erected gallery. The rubberized fabric is held in place by means of two (2) **pre-drilled** steel straps, which are to be installed using the self-drilling screws provided. Pre-drilled holes in the steel straps are approximately 6" O.C. The self-drilling screws will not be able to drill through the flanges of the gallery end wide flanges, as the flange thicknesses will be 3/8" to 1/2". Using the pre-drilled steel straps, mark the flange(s) of the gallery end support rings; match drill the support rings using conventional drilling tools, then install the steel straps, using the self-drilling screws provided. See the detail below for proper orientation of expansion joint fabric. The required width of the rubberized fabric will be determined by the conveyor erector, and will be **cut to required width by the erector**. The expansion joint floor plate bolts into place and is wide enough to adequately cover the gap between spans, allowing for thermal expansion and contraction, by bolting securely to one span end, while **sliding** over the adjacent span end.
See diagram at top of page 5 for clarification.



III. RECEIVING AND STORAGE

1. CamSpan Gallery sections will normally be shipped on flat bed trailers, and should be off-loaded in a lay-down area as close to the actual site of erection as possible.
- B. Normally secured to the trailer by six (6) to eight (8) straps, the CamSpan Gallery sections should be unloaded and stored, off the ground, by using adequate blocking and/or dunnage.
3. CamSpan Gallery sections will normally weigh between **23,000 pounds and 34,000 pounds** (per 60'-0" half-span). Check with Cambelt engineers for weights on your specific job.
- D. Care should be taken to ensure that all wooden crates and other specialized equipment, including electrical equipment, are stored indoors, until the time of installation. Particular care should be exercised to make certain that, whether indoors or outdoors, the equipment is not stored under conditions involving unusual or damaging chemical or caustic atmospheres.

IV. STAGING and BOLT-UP

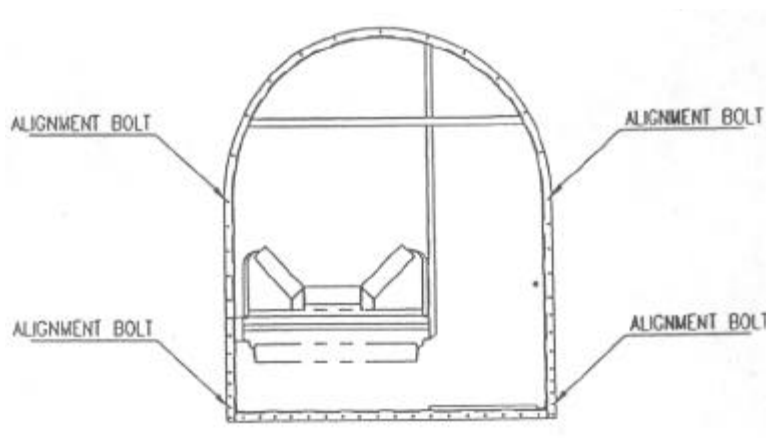
1. As mentioned in Paragraph II.A. above, the standard span length for CamSpan Gallery Conveyors is 120'-0". Normally, the 120'-0" span will be made up of two

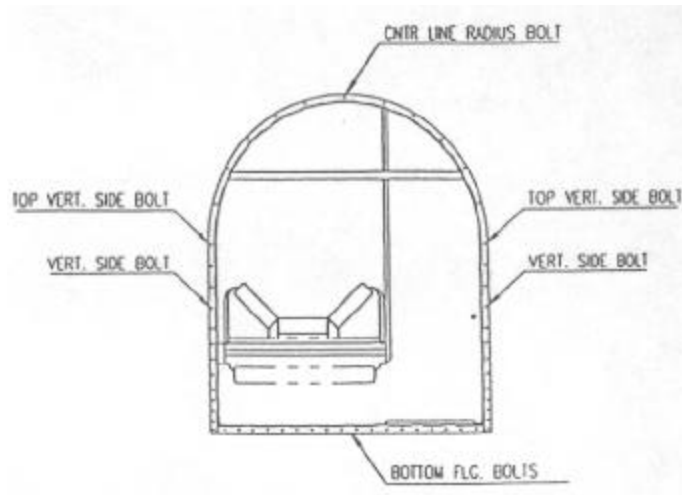
- (2) 60'-0" long modules that are to be bolted together while the modules are on the ground, prior to lifting them up and onto the conveyor support bents.
- B. All bolt up and alignment of the CamSpan Gallery modules should be done on a flat, level area. It is important that no twist or camber be built into the enclosure during staging. **It is the erector's responsibility to be sure the CamSpan Gallery remains "true" at all times during staging and erection.** It is suggested that the erector use a transit or theodolite to assist in this task.
3. Modules that are to be bolted together, that will make up one (1) free-span of CamSpan Gallery, should be set on cribbing, located on the ground, as close as possible to the final "set" location of that span of CamSpan Gallery. The cribbing should allow each CamSpan Gallery module to be as close to "level" as possible. When required, shim underneath the gallery modules, to achieve "level."
- D. Each CamSpan Gallery module is "match-marked" prior to shipment. Make sure all match marks and assembly numbers are staged in the exact sequence, as shown on the field assembly drawing(s).
5. With one (1) 60'-0" module set securely on its cribbing, the adjacent module should be picked up by a crane and butted up against the "cribbed" module. As the flanges begin to match up, and as the entire weight of the module is still being supported by the crane, four (4) alignment bolts should be installed and used to line up the CamSpan Gallery modules (see diagram on page 7). **DO NOT** allow the load of the modules to rest on the alignment bolts.
6. All bolts, washers and nuts, supplied by Cambelt, should be inserted into all pre-punched holes in the flange(s). **DO NOT** begin to tighten fasteners until **all** are in place. Pre-assembly of these flanges was done by Cambelt prior to finish painting of the modules at Cambelt's fabrication shops, so alignment of the holes in the flanges should be quick and easy, with no reaming of holes required for proper fit-up.
7. Marriage of the module flanges, in order to meet codes, should be a "painted surface-to-painted surface" connection. **Do not apply gasketing or caulking materials to the flange surfaces.**
- H. During the bolt-up process, and certainly prior to lifting the assembled CamSpan Gallery span, the alignment of the enclosure should be checked, to make sure that the enclosure is straight. This should be done using a high tension "piano" wire or

string line. It is also advisable that cross-measuring of the gallery enclosure be done, to further ensure that the gallery is straight and square.

1. After the four (4) alignment bolts are in place and “true” alignment of the modules is established, and before tightening the four (4) alignment bolts, install **all** of the bolts (one half-turn tighter than finger-tight) around the entire perimeter of the flange. Then, the tightening and torquing process of all of the bolts may begin. Begin tightening along the bottom flange. Begin at the center bolt of the bottom flange. **All bolts should be torqued as noted on page 8.** After the center bolt is tightened, then tighten the bolt immediately to the **right** of the center bolt; then do the bolt immediately to the **left** of the center bolt. Continue alternately, back and forth, in that fashion, until all bolts along the bottom flange are properly tightened. Then move to the vertical side bolts. Starting at the bottom bolt on the **right** side of the gallery, tighten it as required; then go to the bottom bolt on the **left** side of the gallery. Continue alternately, from side to side, moving up the sides of the gallery until you reach the point at which the radiussed roof of the module(s) begins. **Stop there.** Next, tighten the top centerline radius bolt; then tighten the bolt immediately to the **right** of the top centerline radius bolt; then tighten the bolt immediately to the **left** of the top centerline radius bolt, alternating, from side to side, downward along the radius, **until all bolts are tightened.**

See the illustrations below, to identify the location of alignment bolts, top centerline radius bolt, etc.



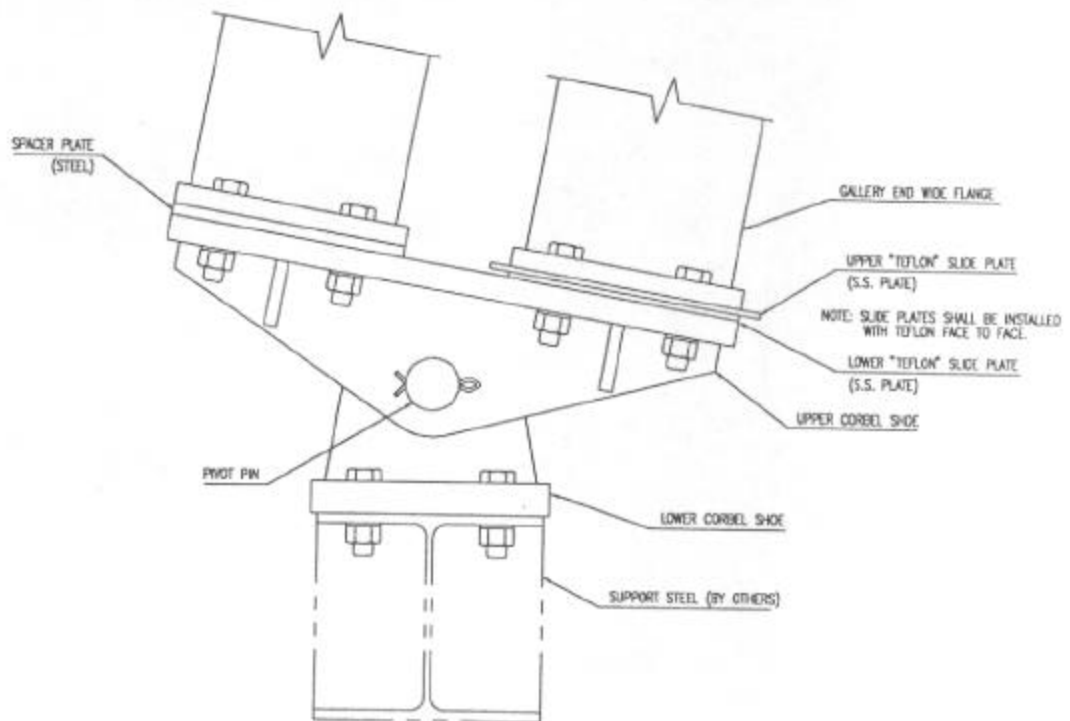


IMPORTANT: The Cambelt supplied bolts and nuts **must be tightened in the proper sequence and pattern**, first to approximately **200 ft-lbs**; then the entire sequence and pattern shall be followed again, finally tightening all bolts and nuts to **355 ft-lbs** of torque. Failure to correctly follow this procedure may result in a crooked or twisted gallery!

10. Inside the CamSpan Gallery, at the top of the radiussed ceiling, is a longitudinal channel. Where the 60'-0" modules meet at the bolted flange, **the channels must also be bolted together**. Install and tighten bolts into the channel connection, using the same torque as used on the exterior flange.

- K. Cambelt International will supply the corbel shoe assemblies that connect the CamSpan Gallery support feet with the support bents or building support steel. Usually, the corbel shoe assemblies should be **attached to the top of the support steel** before lifting the CamSpan Gallery. As the corbel shoe assembly is a "pinned" connection between the two halves of the assembly, in order to prevent rotation of the top half when the load of the gallery is placed on the shoe, be sure to maintain the load of the CamSpan Gallery on the crane, rather than allowing it to be placed on the corbel shoe, until bolts are in place and tightened according to specifications. Also, **now** is the time to place the spacer plates **and** expansion joint

teflon sliding plates onto the top of the corbel shoe assembly. The teflon sliding plates are actually two (2) stainless steel plates clad with approximately 1/8" thick teflon on one side. As these two plates are placed on top of the corbel shoe assemblies, be sure that the teflon sides of the two plates are face-to-face (teflon-to-teflon). Typically, assuming that the CamSpan Gallery is inclined, the “lower” end of the upper half of the corbel shoe assembly will utilize the sliding plates, while the “upper” end of the upper half of the corbel shoe assembly will utilize the solid spacer plate. As the **teflon plates must be allowed to slide on themselves**, the bolts and **locknuts** that go through the plates must be left just barely snug. **However**, when the galleries are initially being set on the corbel shoe assemblies, until the adjacent gallery spans are all in place and secured, the bolts and locknuts at the sliding plate locations must be set tight. Once the galleries are in place, go back and loosen the locknuts **at the teflon sliding plate locations only**. See the detail below for clarification.

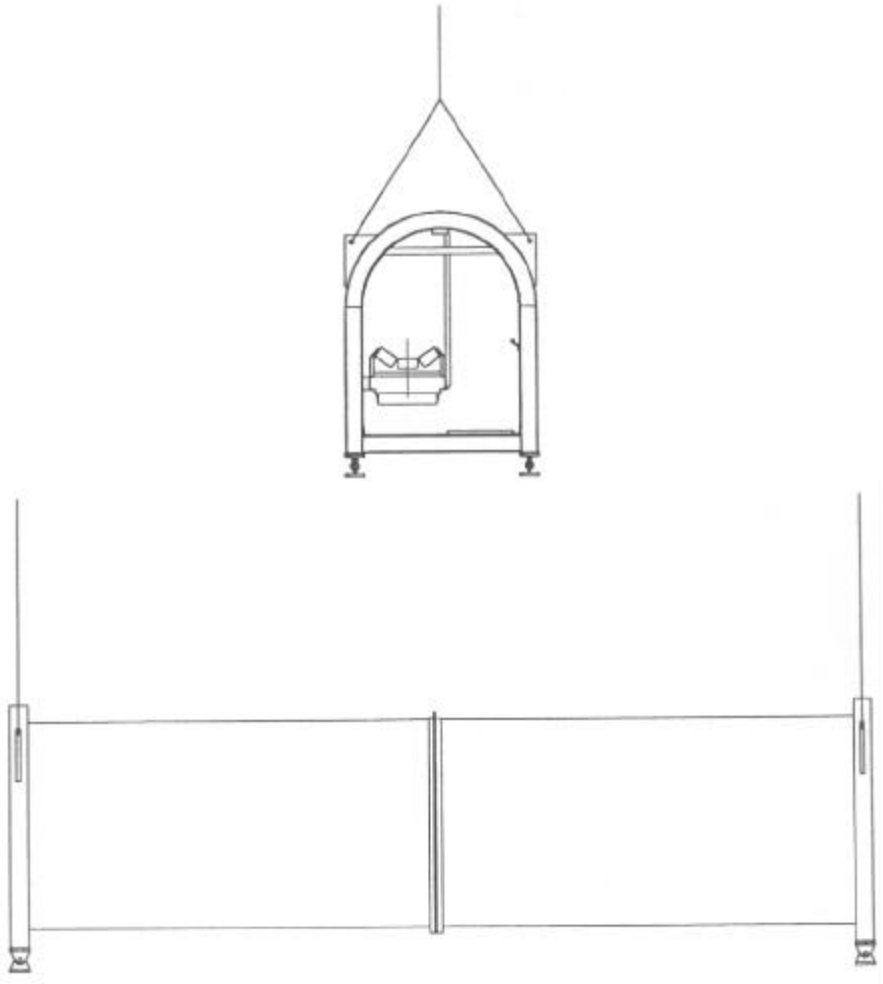


22. LIFTING CAMSPAN GALLERY

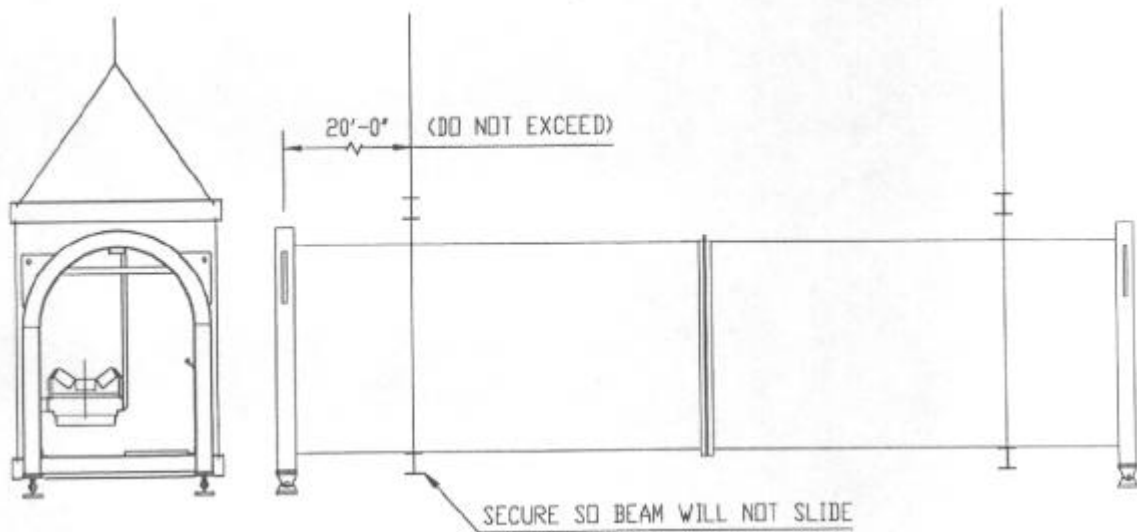
1. Heavy duty lifting lugs are part of the CamSpan Gallery enclosure. They are located on the “U” shaped wide flanges at the ends of each CamSpan Gallery span. Shackles adequate for the load(s) being lifted shall be secured into each lifting lug, and then crane rigging shall be inserted into the shackles. Maximum load per lug shall not exceed 50 KIPS.

- B. The use of two (2) cranes is required.** Use either the lifting lugs provided on the “U” shaped wide flanges, or sling the housing using cables or straps. If **straps or cables** are to be used, proper attention shall be given to how the straps are used, to alleviate the possibility of crushing, buckling or twisting the CamSpan Gallery enclosure. It is strongly suggested that proper spreader bars be used whenever the lifting lugs are not used.
3. Lifting and rigging of the CamSpan Gallery enclosure shall be done according to the following diagrams:

If factory fabricated lifting lugs are used:



If straps or cables are to be used:



- D. Lift the CamSpan Gallery Conveyor up and onto the corbel shoe assemblies. As the holes in the support feet base plates line up with the holes in the corbel shoes, install the fasteners provided by Cambelt, and torque them according to ASTM A325 requirements.

VI. MAN-HOUR ESTIMATES

1. Unless unusual site conditions exist, CamSpan Gallery Conveyors require an unusually few number of man-hours to erect. The **estimates** given below are for what would be required to erect **one (1) 120'-0" span** of CamSpan Gallery Conveyor enclosures.
 1. The **staging and bolt-up** procedures outlined in these instructions will require a three or four (4) man crew approximately four(4) hours to complete.
 2. Lifting of a span will require the same four (4) man crew approximately one (1) to two (2) hours.
 3. Cranes and operators and their associated costs are **in addition to** the above estimated man-hours.

4. Other costs not considered above, which should be considered by the erector are those costs associated with unloading of the modules from the trucks, mobilization and de-mobilization of cranes, cherry-pickers, and other required equipment, moving of modules from unloading area to staging and lifting areas, costs of cribbing materials, indirect supervision, etc..
5. In addition to the above estimates, costs associated with installation of lighting, conduit, wiring, instruments, belt installation, belt splicing, installation of expansion joint closure fabrics and plates, installation of gravity take-up assemblies (if required), and final conveyor belt start-up procedures, etc., should be considered and added to the costs directly associated to the CamSpan Gallery enclosure erection costs.

NOTE: The above erection procedure are guidelines only, and do not relieve the erector from its responsibility of properly rigging, lifting or setting the CamSpan Gallery equipment. Cambelt International Corporation does not assume any liability, nor can it be held responsible for any errors or neglect on the part of the erector or its sub-contractors.