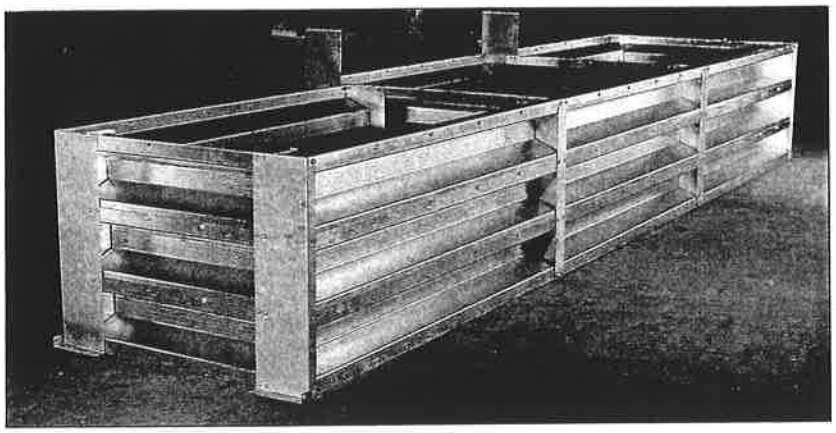
Bolt-A-Bin

The Strength To Support You.



Note: *The information, suggested applications and tables in this brochure are accurate and correct to the best of our knowledge, and intended for general information purposes only. These general guidelines are not intended to be relied upon and we do not guarantee specific results for any particular purpose. We strongly recommend clients consult an Atlantic Industries Limited representative before making any design and purchasing decisions.*

ATLANTIC INDUSTRIES LIMITED

For more than 25 years Atlantic Industries Limited (AIL) has built a reputation based on the quality and durability of the corrugated steel products we have supplied to thousands of projects, ranging from culverts and sewers, to tunnels, bridges, underpasses, and stream enclosures.

At AIL, we pride ourselves on the success of our products and the assistance we provide our customers. We support the excellence of our products with professional project management, innovative problem solving, dependable service in the field, and competitive pricing.

BOLT-A-BIN®

BOLT-A-BIN® is a cellular metal retaining wall that surrounds a compacted mass of granular material. The cells are formed from strong, corrugated metal components bolted together at the jobsite and filled with granular material. The fill material and the metal shell act together as a gravity retaining wall to resist the sliding and overturning forces of the earth behind the wall and the surcharged loading on the bin.

The concept of cellular earth retaining walls dates back to the early 1900's and AIL has improved on the design to provide one of the best retaining walls on the market today.

Forming the metal into the optimum corrugation pattern of BOLT-A-BIN® makes it a strong, durable, cost effective retaining wall offering these distinctive advantages:

STRONG & FLEXIBLE

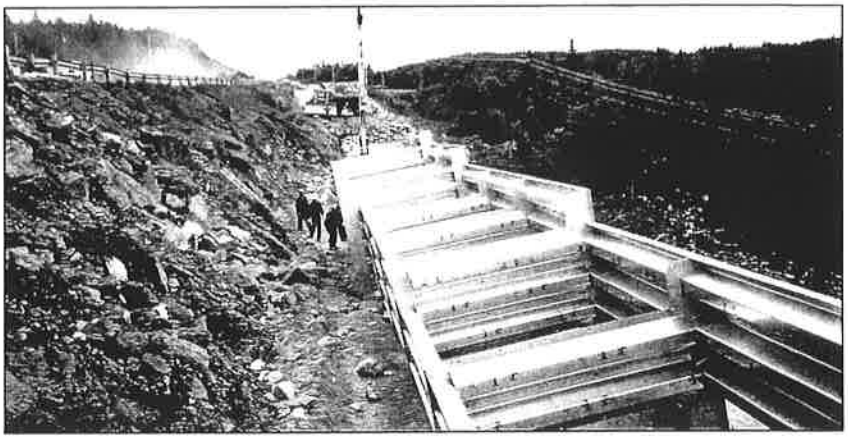
The combination of strong corrugated metal members and soil mass work together to provide a sturdy and dependable retaining wall. The flexible design of BOLT-A-BIN® adjusts to minor ground movement without cracking or bulging, unlike other types of retaining walls.

VERSATILE

BOLT-A-BIN® is available in 11 standard depths and numerous heights to accommodate any project. Larger sizes and configurations are also available.

BOLT-A-BIN® can also be designed to adapt to most horizontal and vertical curves.

Advantages



AESTHETICALLY PLEASING

BOLT-A-BIN® blends in with the natural surroundings. In situations where different facings are required, BOLT-A-BIN® is available in a finish that can be painted or with a variety of facings to best accommodate the environment.

LIGHT & EASY TO HANDLE

The innovative design of BOLT-A-BIN® can save you money on material and installation. This, coupled with the fact that lightweight corrugated steel or aluminum is easy to handle, provides a cost effective retaining wall. BOLT-A-BIN® can be easily assembled by hand directly at the site or it can be partially assembled and moved with light equipment to the jobsite.

ECONOMICAL

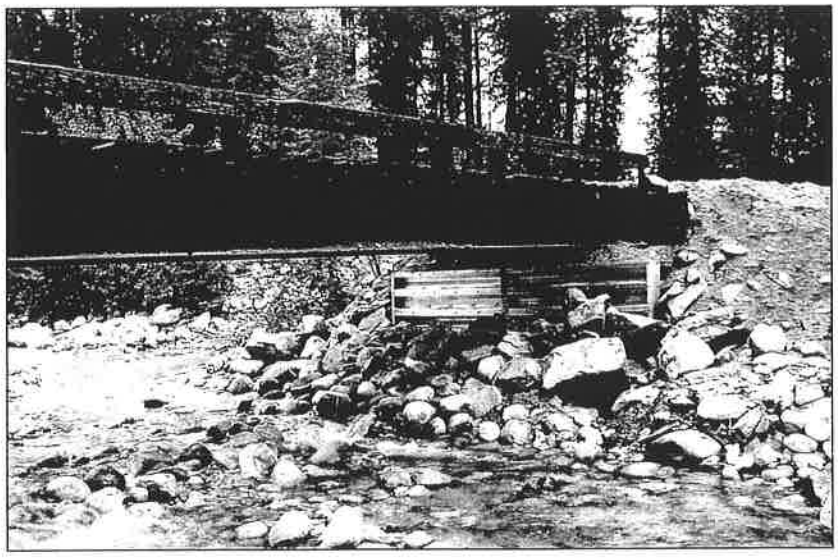
Cellular retaining walls utilize the mass of confined material as the gravity retaining wall leading to a very economical and sturdy wall. Combine this with the fast and easy installation of BOLT-A-BIN® and it is easy to appreciate the cost effectiveness of this outstanding product.

DURABLE

The standard galvanized coating of BOLT-A-BIN® will provide many years of service. For more aggressive applications, BOLT-A-BIN® is available in solid Aluminum and other coatings. AIL will gladly assist you in determining the most suitable material for your project.

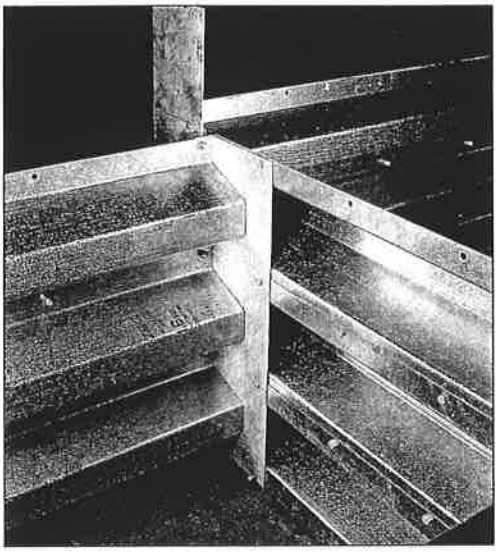
To follow are some suggested BOLT-A-BIN® applications that can help you save time and money and help you finish your project on schedule:

- Solving problems of limited right of way
- Reclaiming sloped land areas
- Stabilizing slopes
- Protecting shores and river banks from erosion
- For road widening or grade separation projects
- Providing wing walls and headwalls for bridges and culverts
- As loading platforms or ramps
- Bridge abutments
- Other applications include wharves, loading docks, barricades, cutoff walls, blast walls, to name a few.

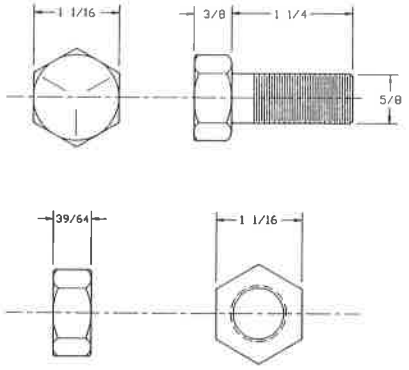


Advantages

Specifications & Standards



Bolts & Nuts
(Typical size for AIL BOLT-A-BIN®)



Note: All dimensions are in millimetres
Bolts, nuts and washers are manufactured in accordance to ASTM A325

STEEL

The galvanized sheet for BOLT-A-BIN® conforms to the requirements of ASTM A525M. The steel components are manufactured in accordance with ASTM A568M and hot dipped galvanized to ASTM B695 with a minimum zinc coating designation of Z600.

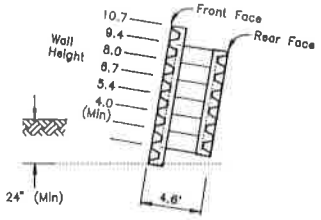
The bolts and nuts are manufactured in accordance with ASTM A325M and hot dipped galvanized to ASTM B695.

ALUMINUM

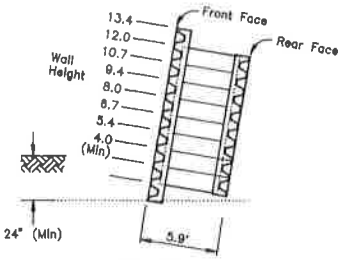
The aluminum sheet and components for BOLT-A-BIN® conform to the requirements of ASTM B209.

The bolts and nuts are manufactured in accordance with ASTM A325M and hot dipped galvanized to ASTM B695.

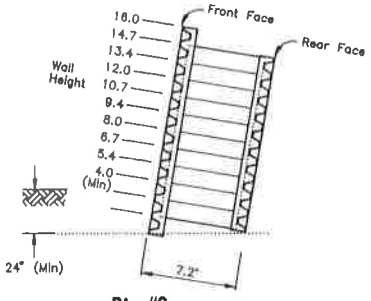
Product Information



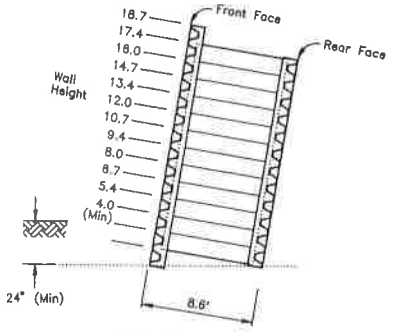
Bin #1



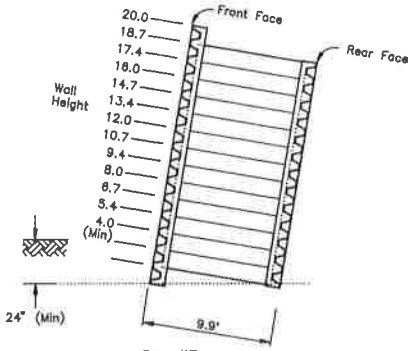
Bin #2



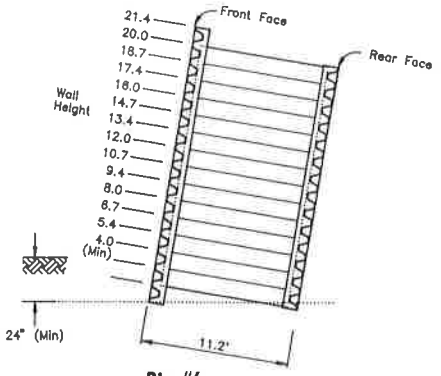
Bin #3



Bin #4



Bin #5



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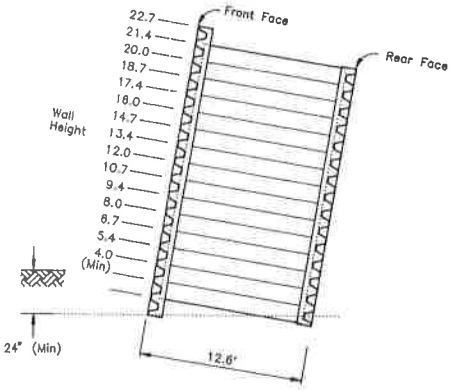
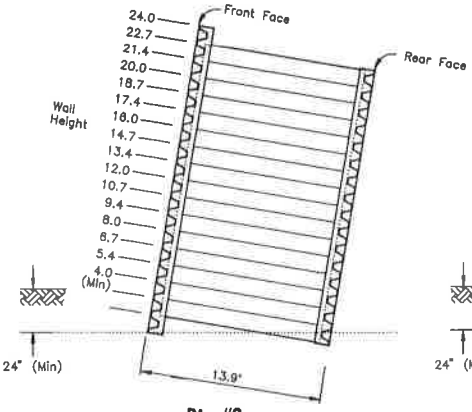
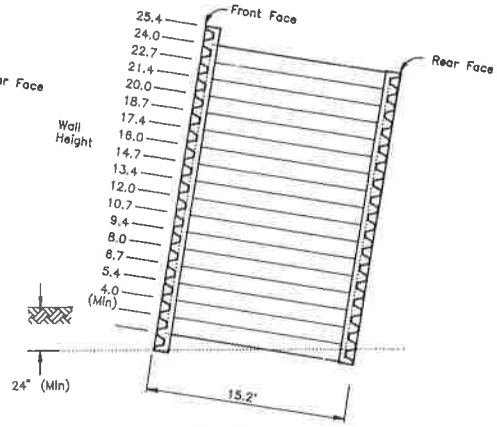


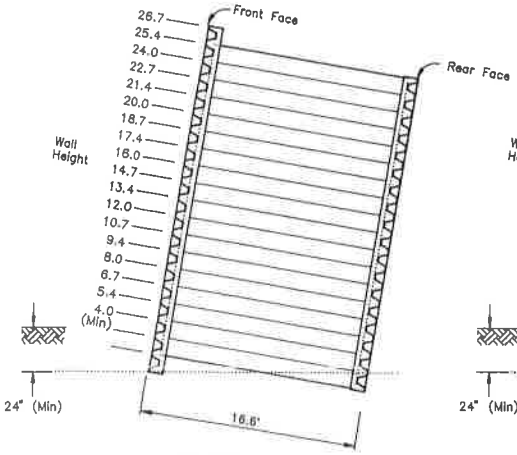
Bin #7



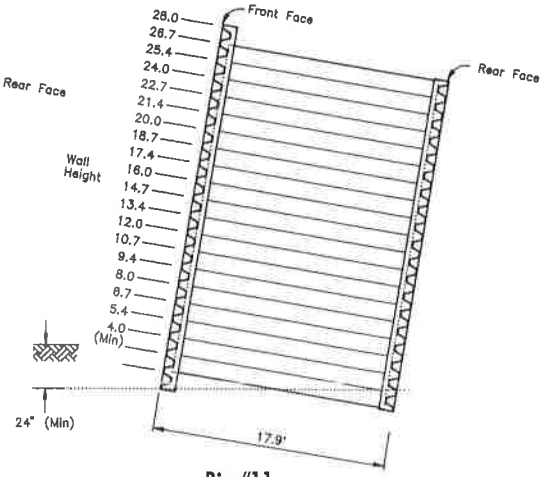
Bin #8



Bin #9



Bin #10



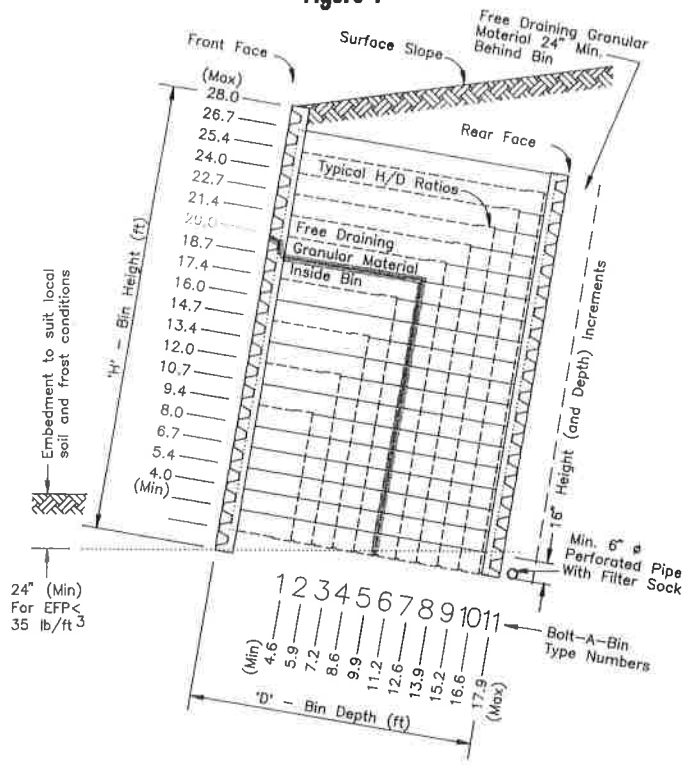
Bin #11

Note: These 11 bins represent standard combinations; other sizes are available upon request and should be individually designed. Please contact your local AIL representative for information on other sizes.

All designs illustrated at 1:6 Batter.

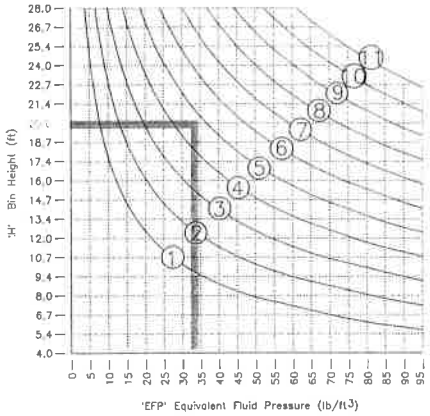
Product Information

Figure 1

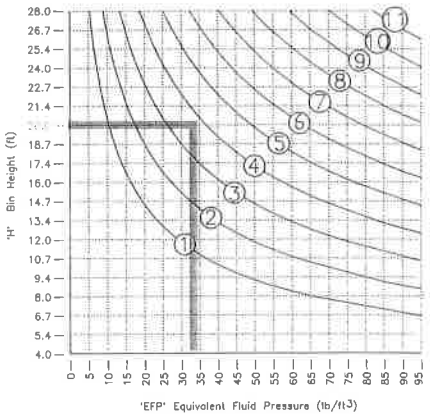


Batter or vertical: A batter wall provides greater stability and should be used where possible. Where vertical walls are required, they can be made more stable by increasing the depth of the bin. Vertical walls are installed on a slight batter to allow for toe settlement.

Graph 1 - Vertical BOLT-A-BIN® Selecton



Graph 2 - 1:6 Batter BOLT-A-BIN® Selecton



BOLT-A-BIN® DESIGN NOTES:

1. BOLT-A-BIN® retaining walls are structures in which the confined earth mass in the bin acts as a gravity wall.
2. BOLT-A-BIN® walls are subject to active pressure which acts on the wall as an equivalent fluid pressure.
3. The weight of the backfill is 120 lb/ft^3.
4. The passive soil pressure is 300 lb/ft^3. (lb/ft^2 per foot depth of wall).
5. The factor of safety for overturning is 2.0 or greater.
6. The factor of safety for sliding is 1.5 or greater, with a coefficient of friction of 0.4.

Please Note: The following BOLT-A-BIN® selection tables are presented as a guideline for estimating purposes. As with any cellular metal wall, the confined earth mass acts as the gravity wall. Support for the wall is needed under the confined earth mass, not under the metal members. The metal bin acts as a container and a compressible cushion of soil should be placed under the vertical members to allow for slight settlement.

These selection tables should only be used for estimation purposes and each individual BOLT-A-BIN® should be designed according to the site parameters. The foundation, soils, height and depth of bins, and backfill material should be engineered for each installation.

Selection Tables

BOLT-A-BIN® SELECTION

1. Select the Equivalent Fluid Pressure (EFP) from Table 1 based on the surface slope and bin orientation.
2. Calculate the equivalent height of wall for surcharged surfaces.
3. Enter figure 1; select a modular bin height for level and sloped surfaces, or the equivalent height of wall, calculated above, for surcharged surfaces.
4. Select the required BOLT-A-BIN® type for EFP and H from Graph 1 or 2.
5. BOLT-A-BIN® selection data is based on average conditions. The engineer of record must modify this data for local conditions which include the density, type and permeability of backfill.

EXAMPLE

Retaining wall required for right-of-way problem. Wall must be 20 ft high on a 1:6 batter with sloped ground at a grade of 1.5:1.

1. Step 1
   Select the Equivalent Fluid Pressure (EFP)from Table 1 EFP=33 lb/ft^3.
2. Step 2
   Enter figure 1; select a modular bin height 'H' = 20 ft.
3. Step 3
   Using Graph 2 (1:6 batter), 33 lb/ft^3 and 20 ft intersect the graph between #3 and #4 bins. Therefore use #4 bin.

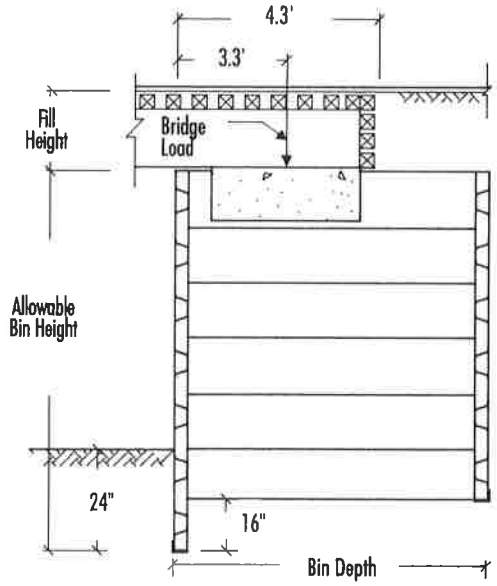
   (If the wall was vertical rather than battered, Graph 1 would be used and as shown by the intersection line bin #5 would be used.)

TABLE 1
EQUIVALENT FLUID PRESSURE

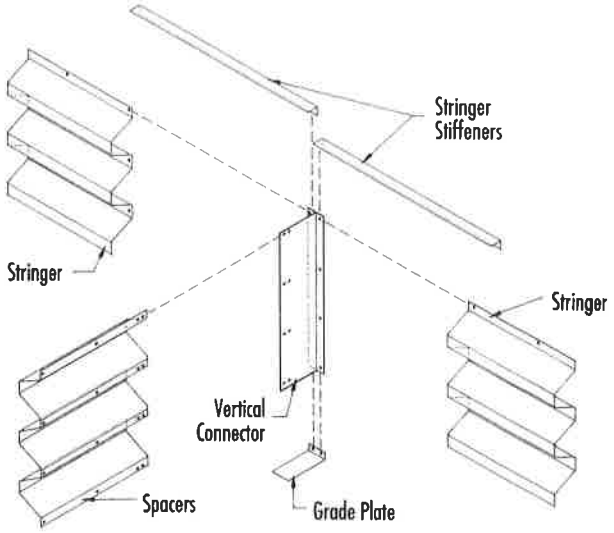
Surface Slope	Bin Orientation: Vertical	1:6 Batter
Level	30 lb/ft^3	18 lb/ft^3
5.0 to 1	32 lb/ft^3	19 lb/ft^3
4.0 to 1	35 lb/ft^3	21 lb/ft^3
3.0 to 1	38 lb/ft^3	23 lb/ft^3
2.0 to 1	43 lb/ft^3	26 lb/ft^3
1.5 to 1	55 lb/ft^3	33 lb/ft^3
1.0 to 1	80 lb/ft^3	48 lb/ft^3
Surcharged	Refer to 'Bin Wall Selection' Note 2	

Note: Equivalent Fluid Pressure (EFP) is defined as the pressure (lb/ft^2) per foot depth of bin and is written as lb/ft^3 for simplicity.

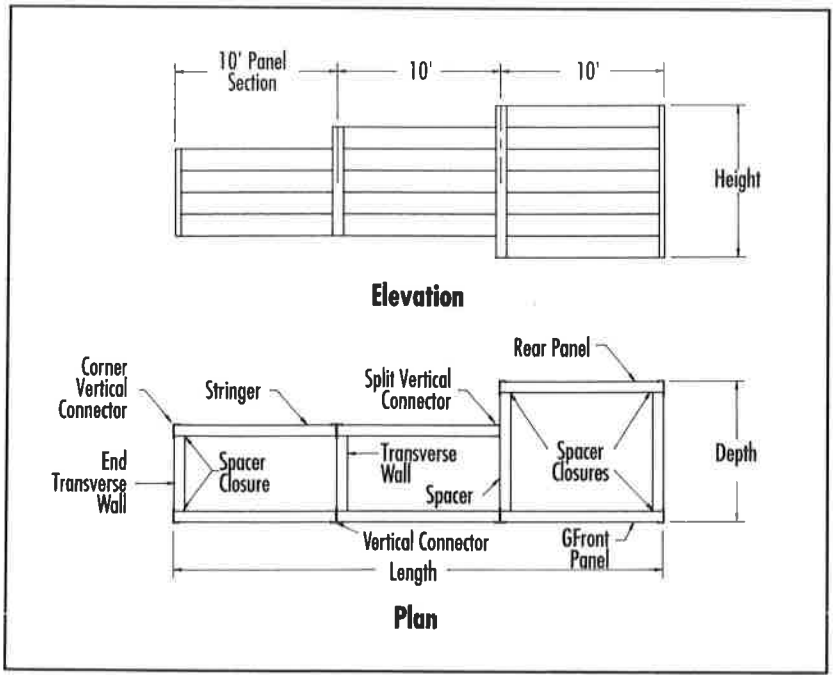
Selection Tables



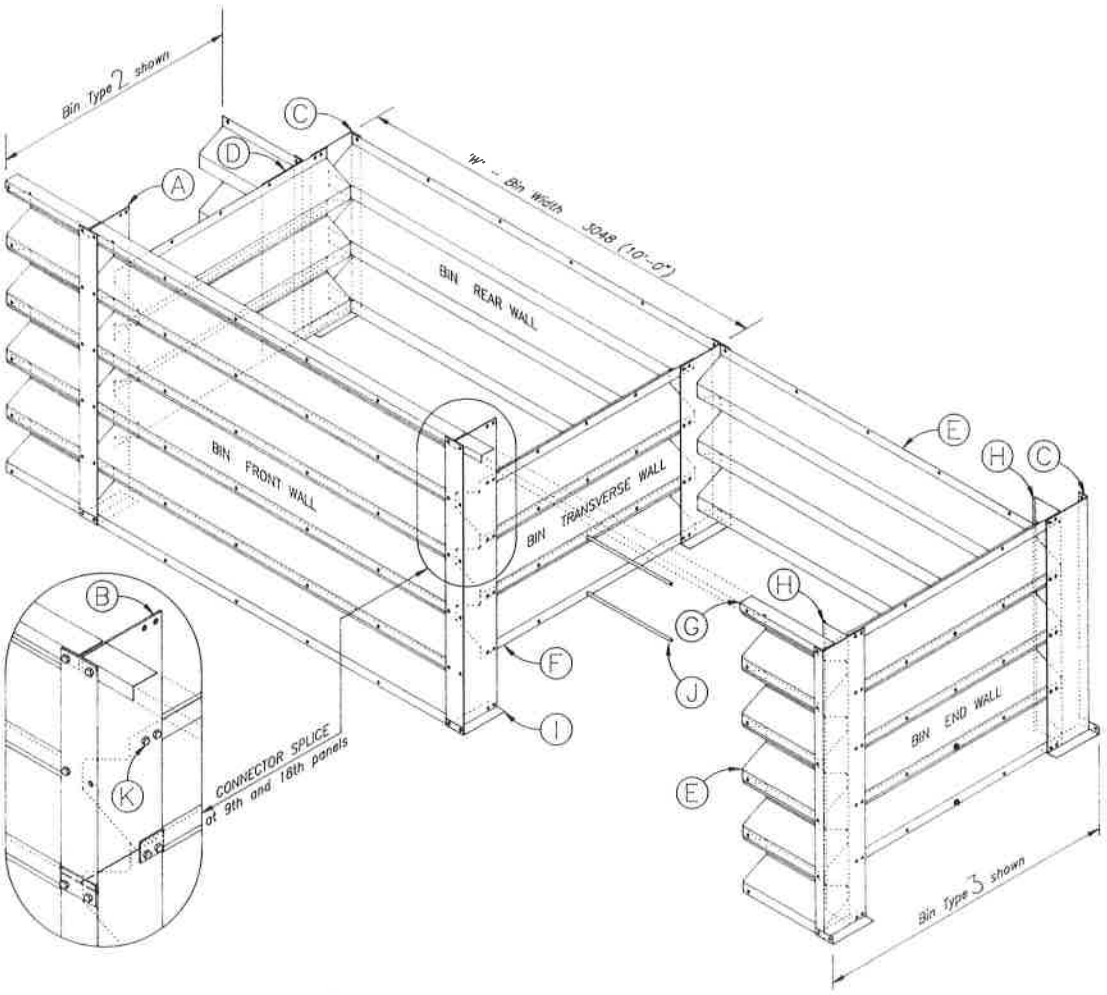
Typical Bridge Abutment



Exploded Isometric



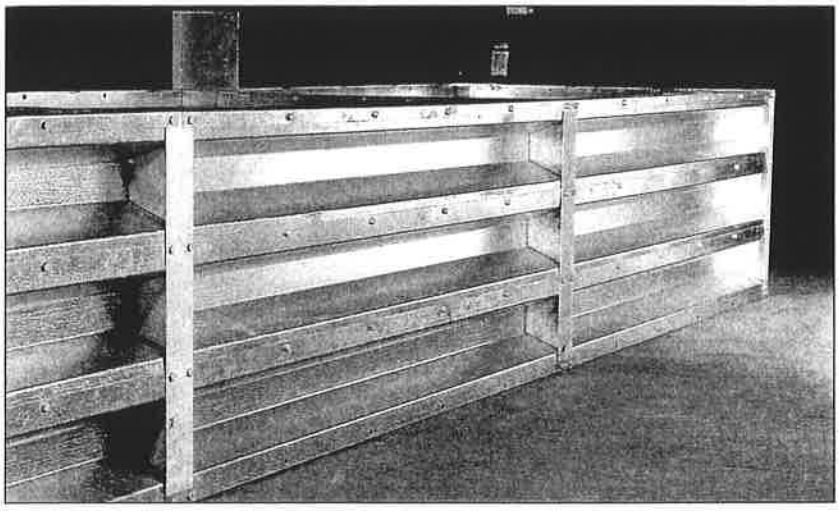
Details



BOLT-A-BIN® COMPONENTS

A. Vertical Connector	Connects stringers and spacers.
B. Upper Vertical Connector	Connects stringers and spacers above vertical connector splice.
C. Split Vertical Connector, Type A	Connects stringers and spacers at end wall corners.
D. Split Vertical Connector, Type B	Connects rear stringers to spacer at change in bin depth.
E. Standard Stringer	Forms front and rear walls.
F. Spacer	Forms transverse and end walls.
G. Stringer Stiffener	Stiffens top stringer (front wall).
H. Spacer Closure	Retains bin fill at end walls.
I. Grade Plate	Assists in bin construction layout.
J. Tie Rod	Reinforces spacers in end bin.
K. 5/8" Bolt	Fastens all components.

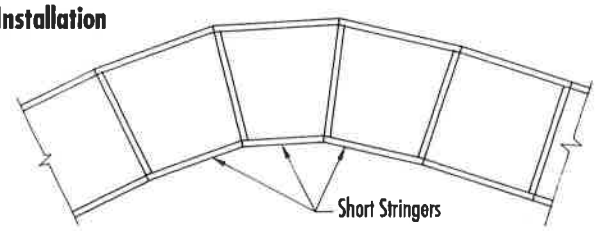
Details



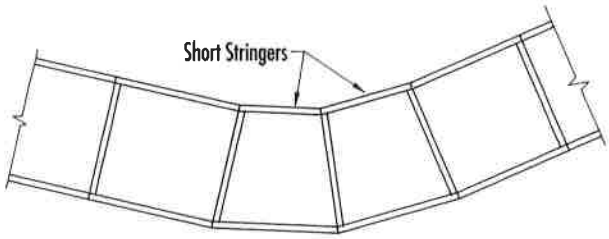
ASSEMBLY

AIL BOLT-A-BIN® structures may be delivered full or partially assembled and ready to be lowered into place, or they can arrive at the site ready for assembly. Every BOLT-A-BIN® comes complete with a detailed plan and set of installation instructions.

Figure 2
Curved Installation



Concave Curve
Plan view using Bin #5 as an example.



Convex Curve
Plan view using Bin #5 as an example.

Experienced erection crews and proper supervision will ensure correct and efficient assembly. AIL can provide, if requested, site supervision for installation of any structures which we supply.

CHANGES IN ELEVATION

Where a change in elevation is required on a sloped installation, BOLT-A-BIN® can be erected on the horizontal and stepped in increments of 16" to accommodate almost any grade.

CURVED INSTALLATIONS

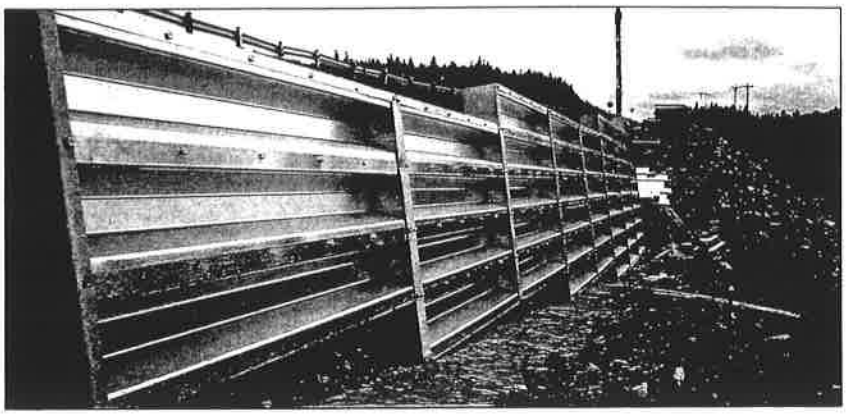
BOLT-A-BIN® can be designed to accommodate almost any degree of curvature or change of direction. The most common method of adjusting for curves is by shortening the front stringers for concave curves or the back stringers for convex curves (see figure 2). AIL can assist you with the best method of incorporating BOLT-A-BIN® into your straight or curved installation.

SITE PREPARATION

A thorough investigation should be conducted of the BOLT-A-BIN® site location. On rigid or unyielding foundations, provisions must be made to allow for slight settling of the vertical corner members. It is normal practice to provide a compressible cushion of soil under the grade plates of minimum 8".

The site preparation should provide a good base for the structure. The base should be of good quality material, free

Installation



from rocks, roots, debris, and organic material. The bed should be well graded, level and in accordance with the elevations of the contract drawings.

BACKFILL

Because BOLT-A-BIN® structures derive their strength from the enclosed mass of earth, close attention must be paid to the design of the backfill requirements. A full site investigation and soils analysis should be performed by a qualified geotechnical engineer.

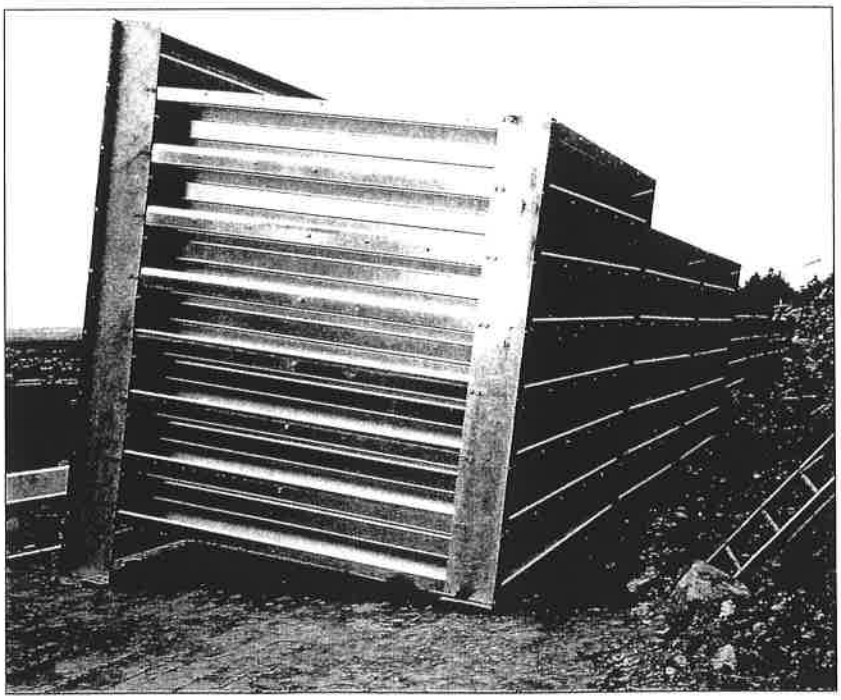
The backfill material should be clean, free draining granular material, and have good compaction properties and be approved by a qualified soils engineer. The backfill material should be a maximum of 2" and contain no more than 5-10% fines (passing through No. 200 sieve).

The backfill material should be placed in 6" to 8" layers both in the bin and directly behind the bin. The backfill should be compacted to 95 percent Standard Proctor Density. Special attention should be paid to the corrugation area. The corrugations should be filled and carefully compacted by hand to ensure a successful backfill.

DRAINAGE

The backfill in the bin and directly behind the bin (minimum 24" distance behind the bin) must be free draining material. A perforated pipe (minimum 6") wrapped in filter fabric should be placed at the bottom of the wall near the rear face and should be vented away from the structure.

The area around BOLT-A-BIN® should be graded to carry water away from the structure and ensure that ponding does not occur.



Installation