CONSTRUCTION PROCEDURES

This chapter covers the procedures required to successfully construct a building using the UBM-240 building system. Efficiency in construction is achieved when each crew works independent of each other to accomplish their own tasks while at the same time each crews works together as a TEAM creating a smooth flow of work. The TEAM working together in the process provides one continues construction effort yielding rapid and amazing results.

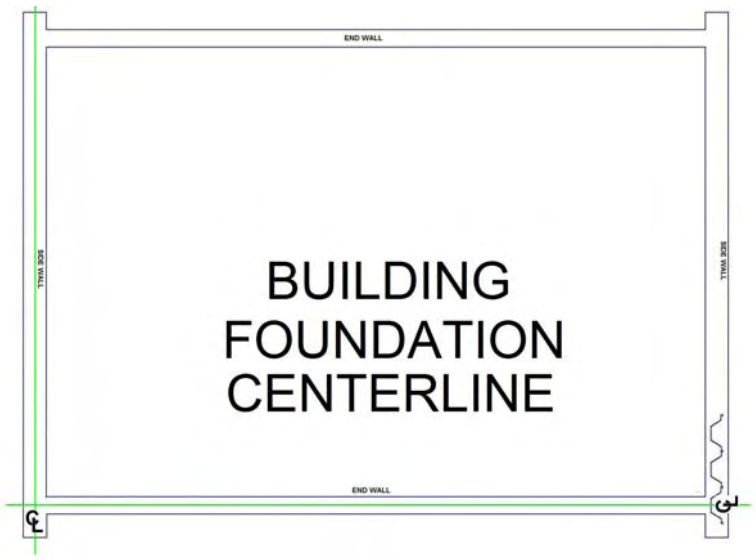
7.1. Site Setup

7.1.1. Concrete Forms / Angle Iron

A properly placed and cured foundation is a prerequisite to constructing a building produced by the UBM-240 machine. We have described in Chapter 3 and 4 the M.I.C. Industries supplied concrete form system. This chapter will show how to attach this form system to the concrete foundation creating a platform which the building will be constructed on. This platform holds the building suspended off the foundation and keeps it properly orientated until a concrete curb is poured locking the building to the foundation.

First the engineers must verify the foundation has been constructed in a way that will accommodate the concrete forms. They must check and verify the foundation is square and level and is of sufficient width to allow the concrete forms to be secured to the foundation using steel stakes or concrete anchor bolts.

The following graphics illustrate the proper procedure to follow when checking and verifying the foundation.

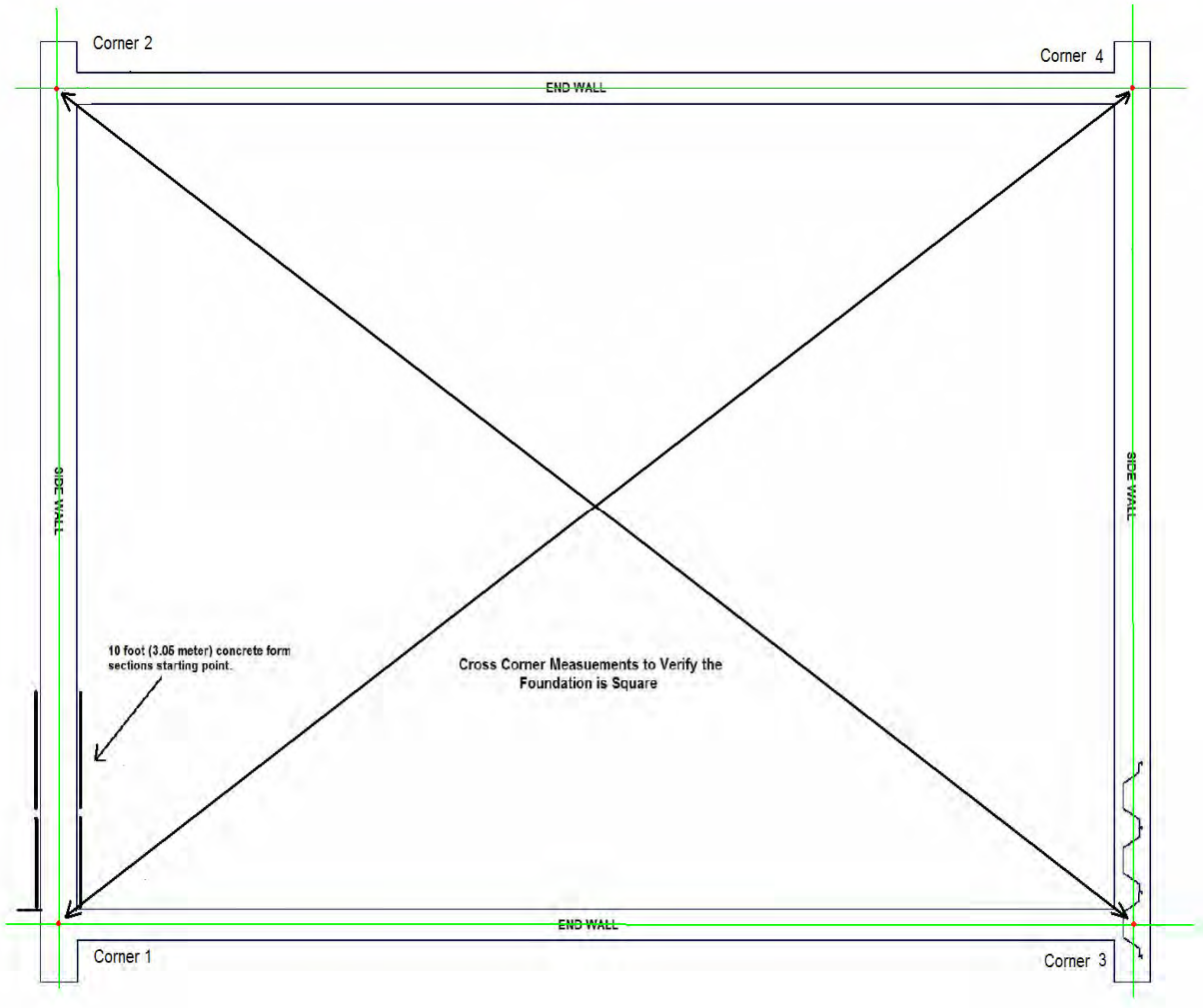


Step 1- Establish the centerline measurement of the foundation. Insure that the centerline of the foundation is located in the center of the side wall and end wall of the building as

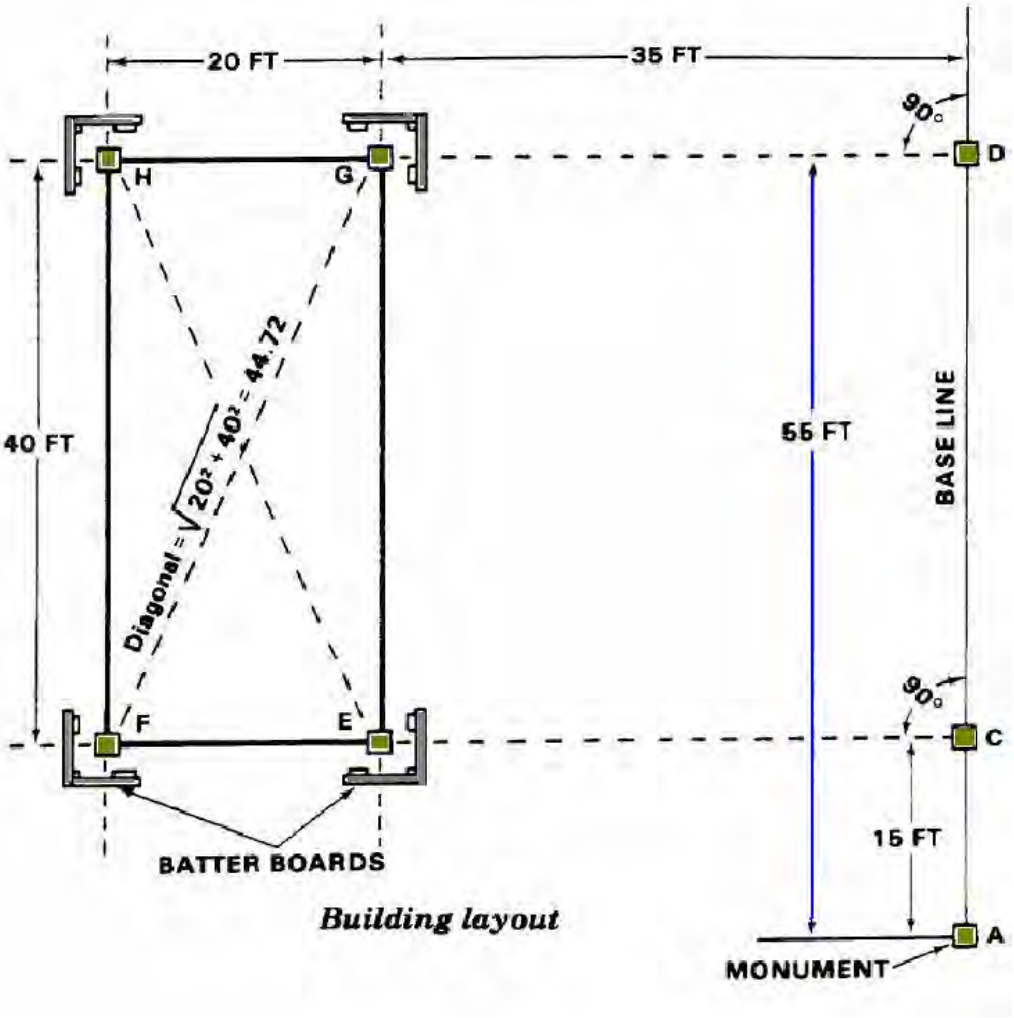
shown in this picture.

Step 2- Check the foundations for square. There are several methods that can be used to perform this check; any field engineer will have performed this check many times.

1. Dialogical cross measurement: If the building is not two large the diagonal cross corner measurement method can be used. Use a long tape measure and measure diagonally across the building from one corner to the other. A square foundation will have the exact measurement in both directions.

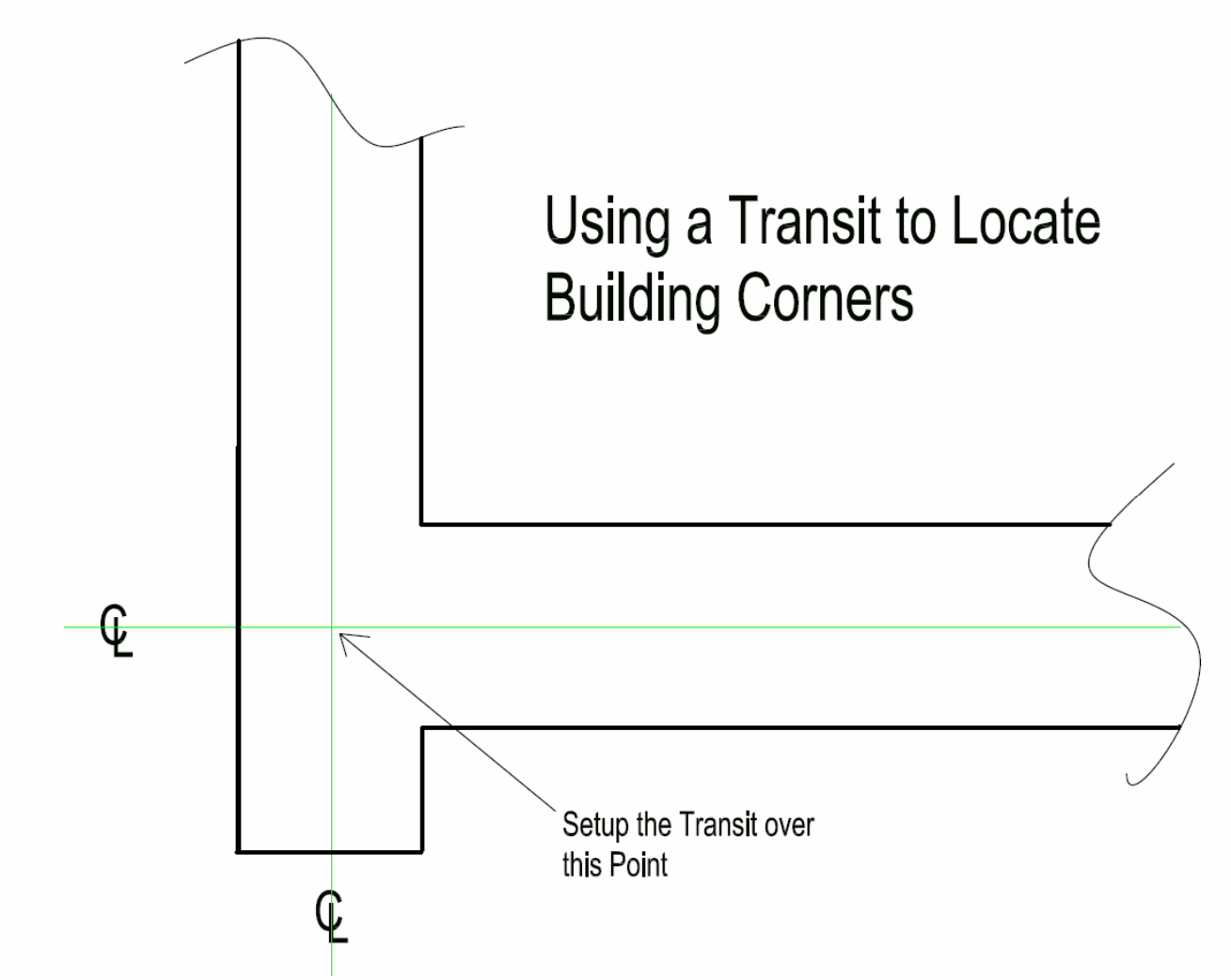


This example shows the layout of a conventional foundation where batter boards have been installed and used. This procedure is used to initially layout the building for excavation of the foundation. This same principle procedure can be use for the UBM building. The diagram shows the Diagonal measurements. The formula used to calculate the diagonal distance is shown.



Building layout

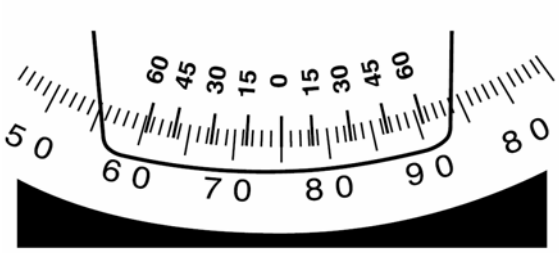
2. Transit maybe used to verify that the foundation is square. Using a transit requires a skilled individual that knows how to setup and operate it. The transit must be setup over one corner of the foundation, this is your starting point and you should start on the end of the building where you plan to start construction of the building. Set the transit over the point where the sidewall and end wall centerline intersect. Use the following method to set the transit.

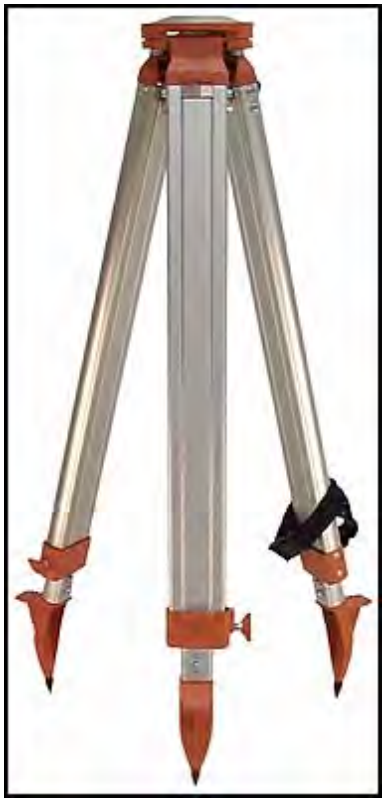


- Setup up your tripod over the desired point and attach the transit to the tripod. You must insure the legs are set properly in the ground.
- Attach a plumb bob to the transit then shift the transit on the tripod head until the plumb bob is directly over the point.
- Level the transit using the leveling screws and bubble vile.

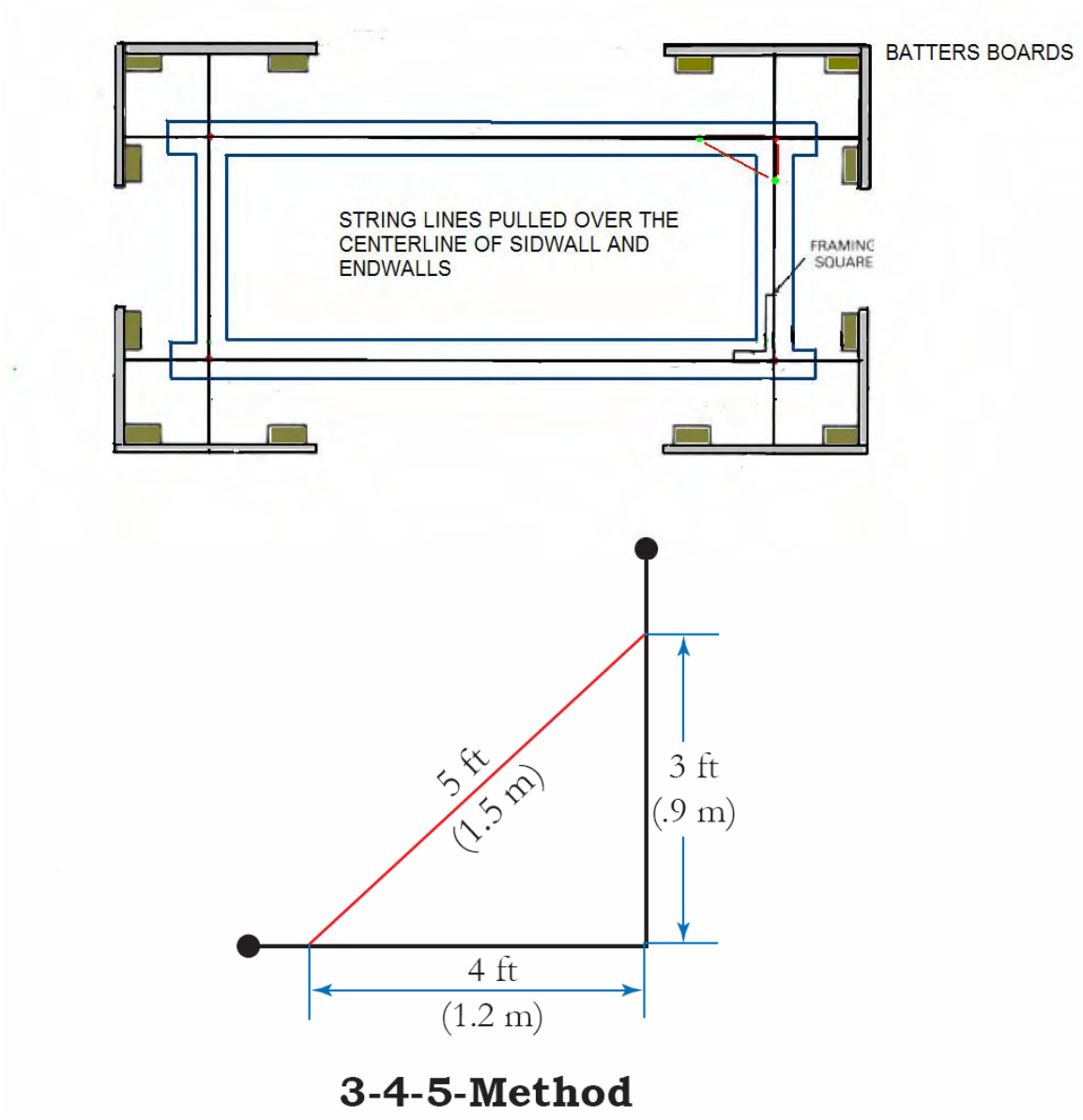
3. With a long tape, measure from where the plumb bob points for the length of the building. Look through the transit and sight in on the end of the tape measure and mark the spot. Ensure the mark is in the center of the foundation.

4. Set the horizontal circle at zero to coincide with the vernier zero. Rotate the transit 90° and measure the width of the building along the center of the side wall. Sight in on the end of the tape again and mark this spot, this location should be centered on the end wall foundation and centered on the second side wall foundation. If this is not true then one side wall is not square to the end wall. Relocate your transit and setup up over the 2nd corner that you just marked. Sight-in on the corner where the instrument was previously setup over (1st corner), rotate the transit 90° and again measure the length of the building. Sight in the on the end to the tape and mark this spot, this is the 4th corner. Your mark should be in the center of the sidewall foundation. Measure between the 2nd and 4th corner, this measurement should be the building width if the foundation is square.



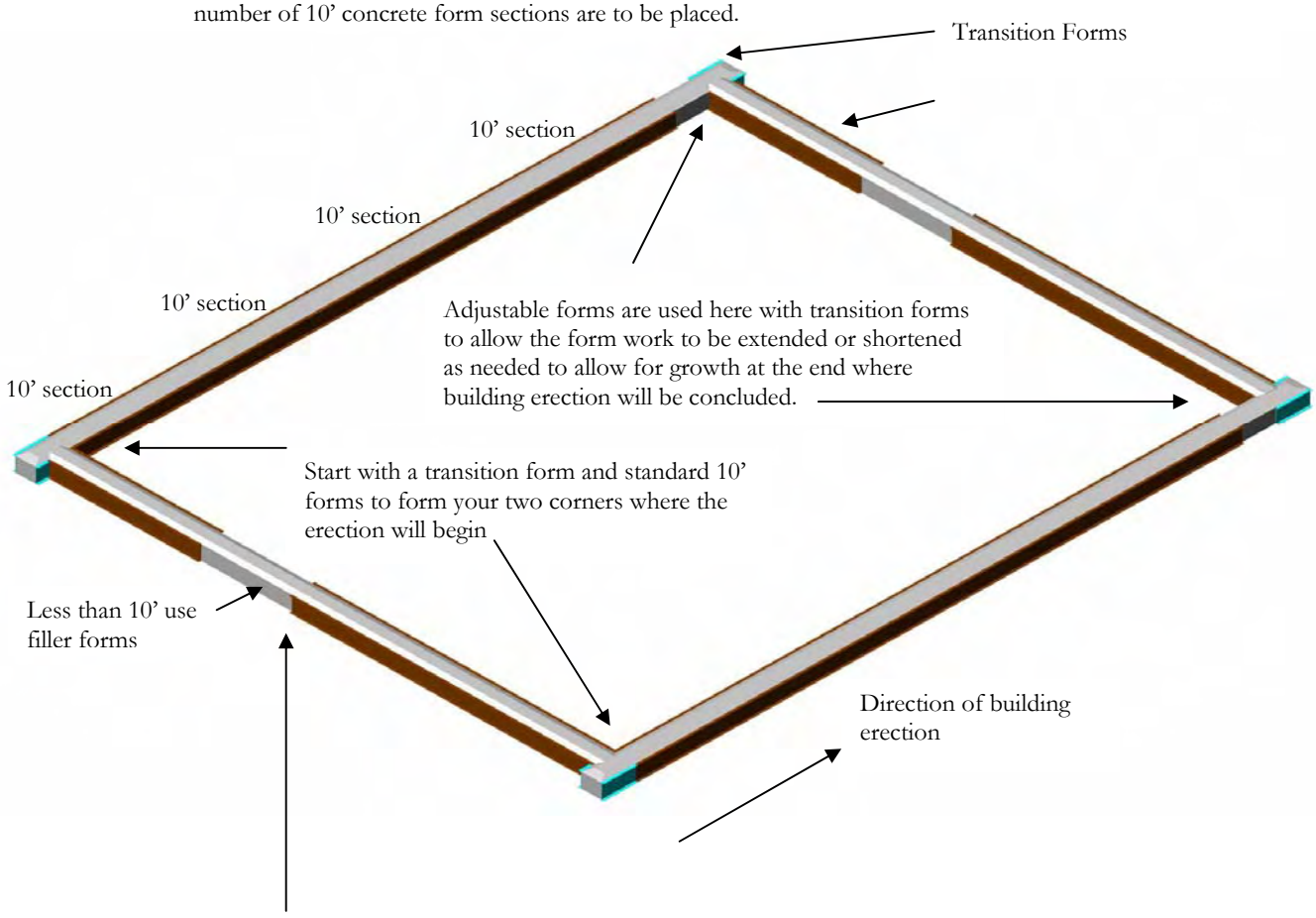


String lines and batter boards can also be used to check the foundation. In most cases batter boards have been put in during the course of foundation construction and should still be in place. With string lines pulled over the center line of the foundation you can use the 3-4-5 method to check the foundation for square. Measure out from the corner 3' (.9 m) one direction and 4' (1.2m) in the other, mark the string line. Measure the diagonal distance between the marks. If the foundation is square the measurement will be 5' (1.5 m) in length.



Concrete forms must be assembled and installed securely on the foundation. First collect the parts of the concrete form system from their place of storage and move them to the construction site. Inventory the system to insure sufficient quantities are present to accommodate the building design.

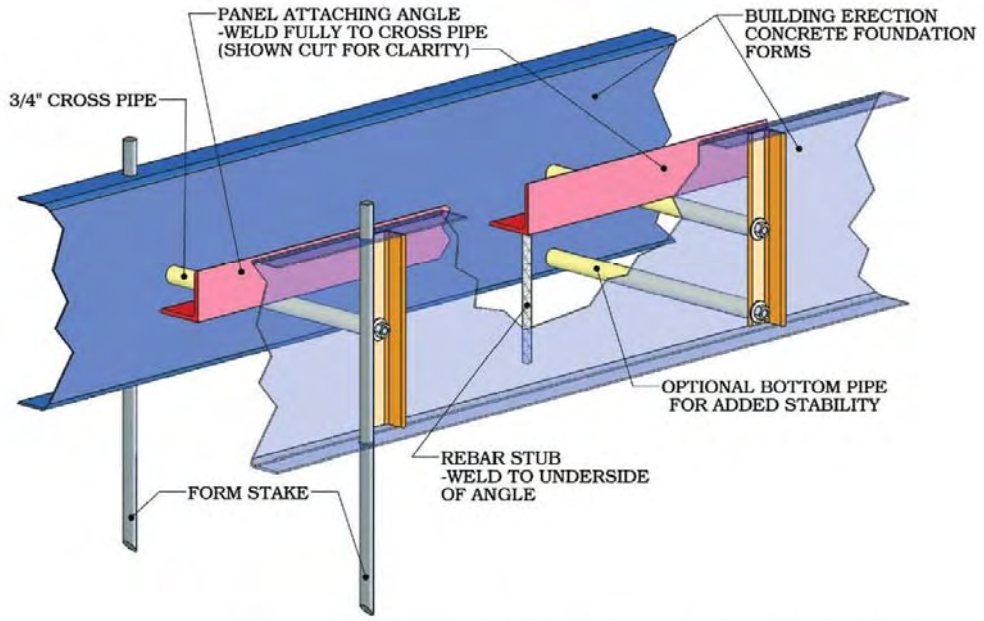
Engineers should draw up an installation plan, a print showing how each piece of concrete form is placed around the foundation, this should decrease the time needed to install the system. This plan will indentify the location where filler form sections, adjustable form sections are and the exact number of 10' concrete form sections are to be placed.



Set the corners in place and work towards each corner with 10' form sections. The areas where a 10 foot form section will not fit is where you will utilize the filler forms which will allow you to close any opening less than 10'. You should have a set of filler panels on each side of the foundation.

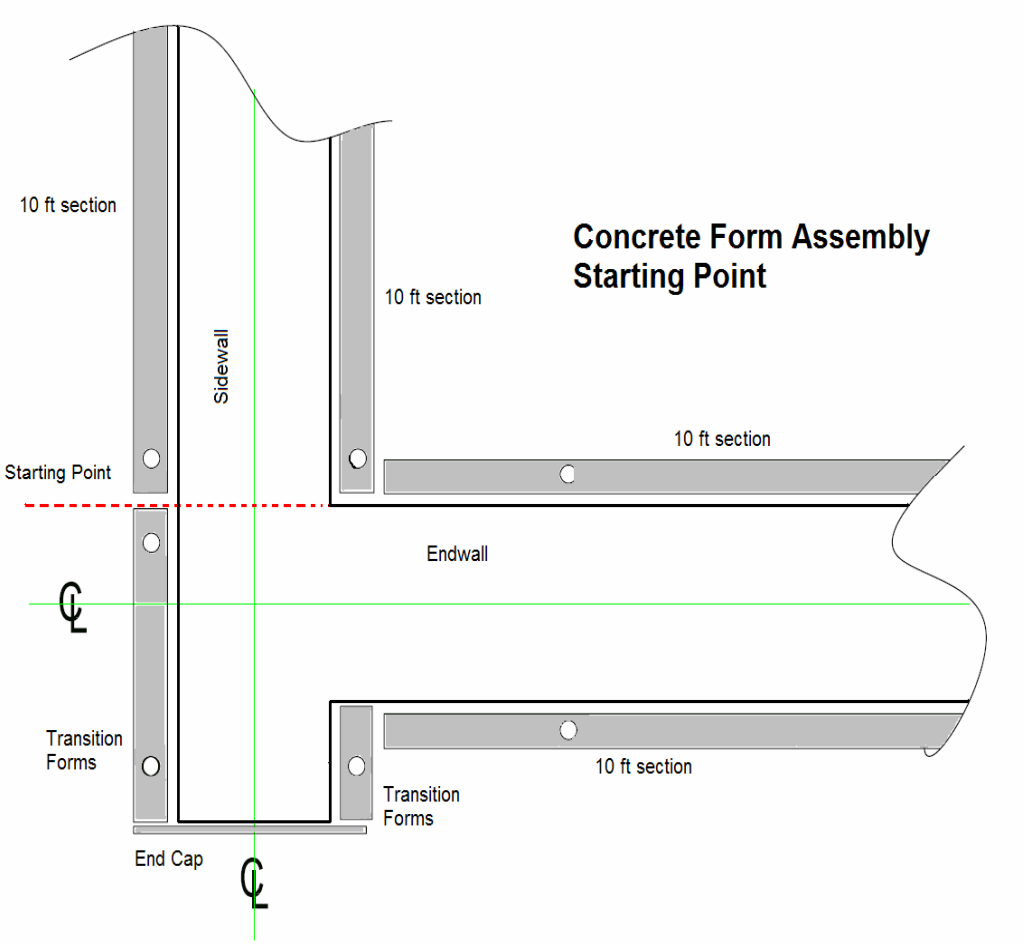
Cut the steel tube to length. The MIC-75 is equipped with a chop saw and metal cutting blades that can be used for this purpose. Care must be taken to insure the spacer pipes are cut square and the same length.

Layout and assemble the 10' sections using the spacer pipe, all thread, and nuts.



Building Erection Concrete Foundation Forms

The starting point for placing concrete forms is shown in the graph below. The large 10 foot sections should be connected with the spacer pipe and then the completed sections are placed on the foundation and anchored.



Install corner transition forms at the end of the building foundation where construction will start

Connect one assembled 10' form section towards both directions to these transitional forms.

Place corner transition forms at the end of the building foundation where construction will stop.

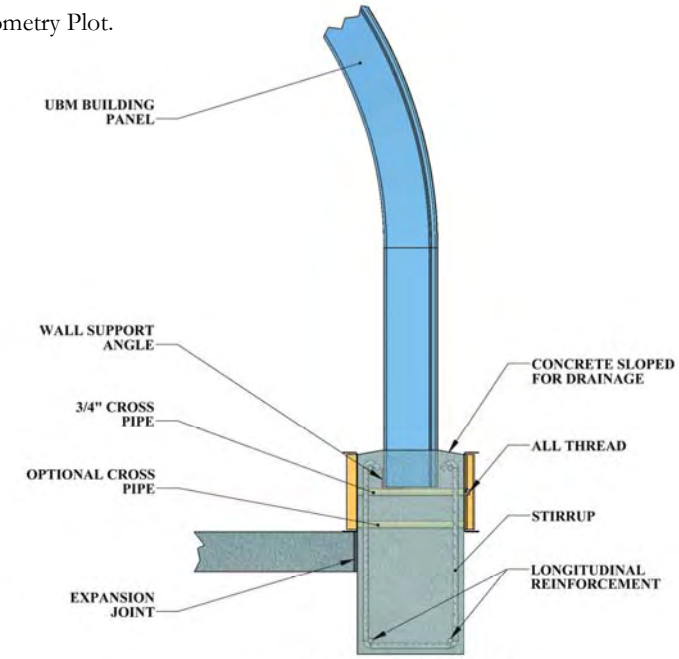
Connect one assembled 10' section towards both directions to these transitional forms.

Install the 10' section from each corner transition forms towards the other corners.

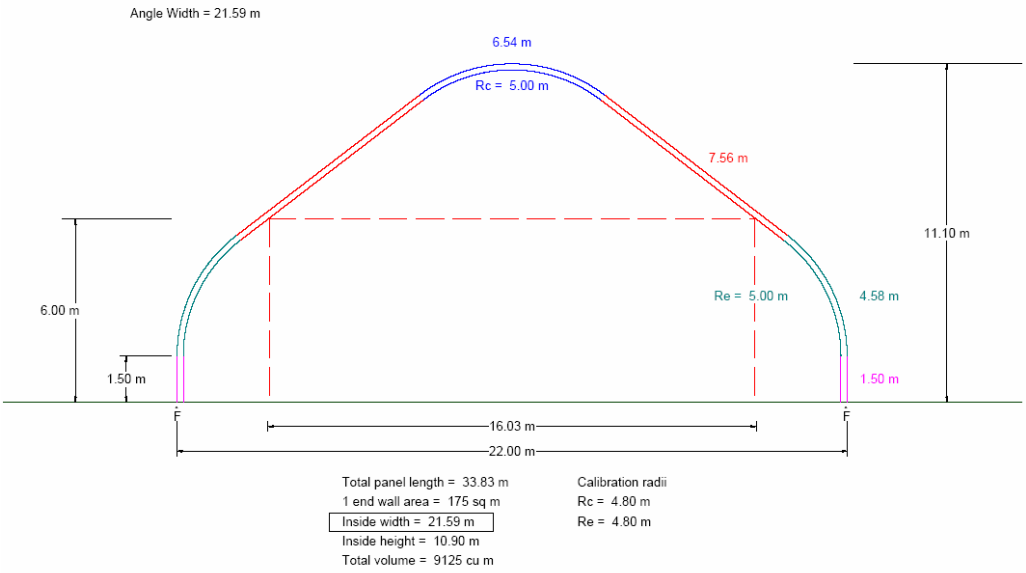
Install filler forms where 10' sections are to large to be utilized.

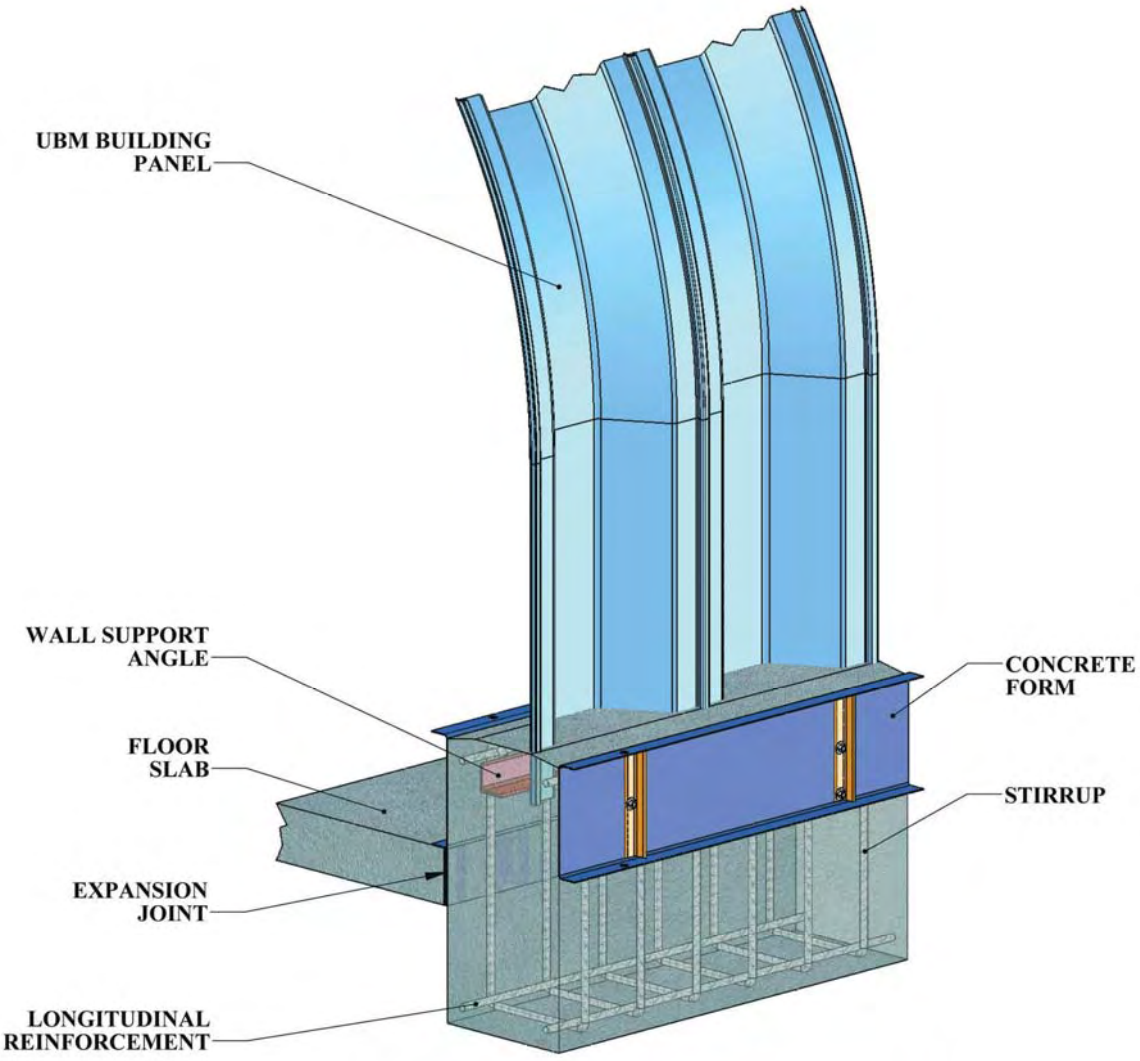
Place and secure the wall angle to the spacer pipe and weld in place.

The most critical task in installing the M.I.C. concrete form system is locating and securing the wall angle. This angle provides a support which the building will rest and secured to until concrete is poured. A second purpose for the angle iron is to maintain the proper location of the sidewall, it must be 4" off center to the inner side of the curb. It also maintains the distance between the two sidewalls, the 4" offset, is the inside measurement of the building which can be found on the M.I.C.PROSOFT Geometry Plot.



Concrete Foundation (Front View)





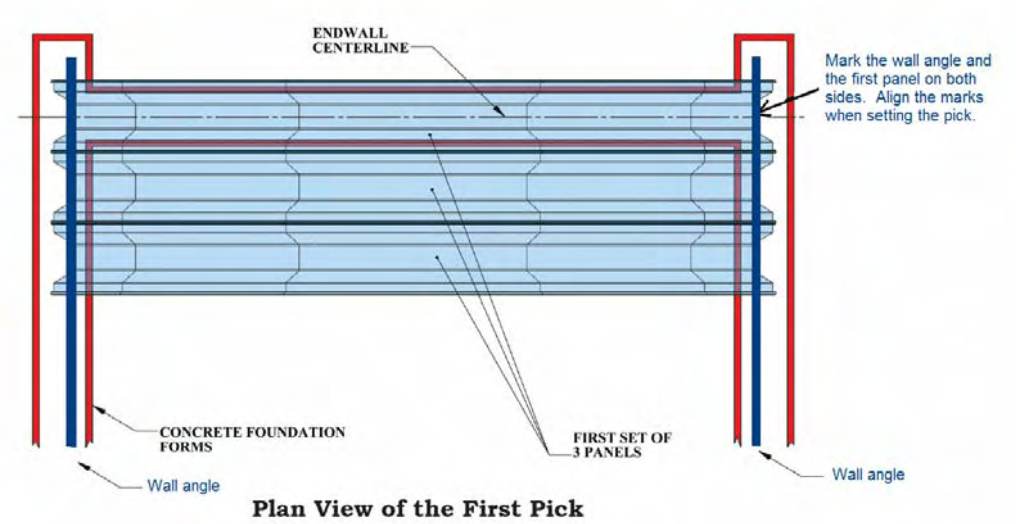
Concrete Foundation (Isometric View)

The angle iron must be straight, level, and securely welded. These welds will keep the building in place should bad weather occur during construction.

Caution: The building is most vulnerable while it is sitting on the concrete form system prior to the placement of concrete. Every effort must be made to place the concrete as soon as possible after the last pick is set. High winds could cause the building to collapse while in this state.

7.1.2. Pick Anchoring Methods

With the concrete forms in place and the wall angle properly installed the crew must locate the starting point for the building. Marking the wall angle at this location will tell the erection crew where the first roof panel must be placed. In most cases the center of the first roof panel must line up with the center of the end wall. Place a mark on the angle iron on both sides of the side wall foundations; the erection crew will mark the center of the first panel. When setting the 1 pick align the two marks, this will place the end wall center the end wall curb.



Plan View of the First Pick

With the foundation forms in place and the proper reference marks on the wall angle. The erection crew is almost ready to set the first pick. Before this takes place a system for temporally anchoring the first pick must be established. This anchoring allows the pick to be plumbed and provides protection from wind. It also makes the pick safe for workers to climb on while disconnecting the crane after the pick is set.

The best method is to use 4 to 6 steel coils and ropes. Attach the ropes to tabs in the pick and tie off in opposite directions to the steel coils. The ropes should be crossed in a fashion to gives support from the side as well as front to back as shown below.

Other systems include stakes in the ground, concrete block, or large pieces of equipment. If equipment is used, the equipment must be disabled so it cannot be moved while the building is attached to it.

Do not tie the guy ropes to any sharp objects such as tab hangers that have been torched to create a hole for attachment. These sharp edges can fray or cut the ropes and allow the structure to be unsecured.

7.1.3. Welder

The building must be fixed to the angle iron; this keeps the building attached to the foundation until concrete is poured. Welding is the best and most efficient way to accomplish this. M.I.C. Industries manufactures a Construction Support Unit containing all of the tools necessary for the construction of a UBM building. This trailer contains an electric arch welder. If this unit is being used it must be located where it will not interfere with the flow of work but should reach both sides of the building as the welder must weld every building panel to the angle iron.

The same consideration must be made if using a welding machine from another source. This welder must have sufficiently long leads to reach both sides of the building. It must be placed where it will not interfere with the flow of work. The welder must be on site for the entire duration of building erection. This equipment should be shown on the site plan.

Caution: The welder must be grounded to protect against electric shock. The welding equipment should not be staged where rain could fall directly on it and personnel should not be standing in water near welding operations. The workers must not allow the electric leads to lay in puddles of water while engaged in welding operations.

7.1.4. Positioning of Necessary Tools

Tools necessary to perform the construction must be staged. If the MIC.-75 is not on site the following tools must to be obtained and staged on the site.

Ladders with Support Assemblies
Tanker Bars
Wood (2x4's to be used for bracing)
Measuring Tapes
Cable Come Along
Leveling/plumbing Device
Power Extension Cords
Marking Devices (Sharpie, Soap Stone)
Fall Restraint System

Additionally, the following tools are necessary to construct end-walls. These need to be obtained and staged in the construction area:

Channel Curver
Saw Horses
Hand Shears
Electric Drill w/Bits
Self Tapping Screws
Combination Square
Radius Marking Device
Man-lift or Scaffolding Sufficient to Reach the Top of the Building

7.1.4. Seamers and Clamps

The assembling of panels (building Pick's); Pick's are 3 panels seamed together on the ground that creates a section which will be lifted and set on the foundations. Building Picks requires tools (R9 vice grip clamps) that allow panels to be connected to each and held together then electric seaming machines are used to permanently lock the panels together. The assembly crew will setup their area and stage this equipment.

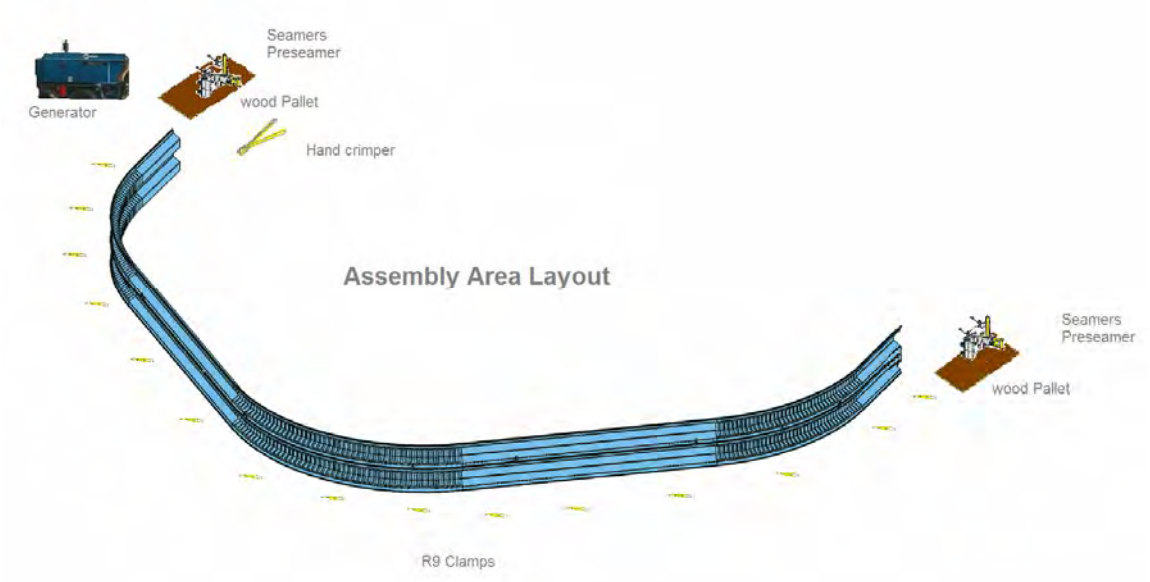
The Hand crimper will be used at the end of the panel where the seamer will start the seaming process. This is a mechanical device that a crew member will use to manually crimp a portion of the seam to create a starting place for the seamer. Recommend 12 to 18" (30.48 to 45.72 cm) is hand crimped

The Pre-Seamer is staged on the side with the seaming machine. During the curving process for tight radius buildings, the Hook will have a tendency to deform a little around the radius portion of the panel. The Pre-Seamer is used to open the Hook so the Hem on the next panel will seat easily onto the panel.

The seaming machine (Seamer) is staged at one end of the panel. During the seaming process the Seamer will alternate its starting point from one side of the building panel to the other.

It is important that the Seamer and Pre-Seamer be kept clean. A wood pallet or plywood sheet should be used as a platform to place the machines on when not being used. This will keep dirt and sand from getting into the inner workings of the machines.

The below picture illustrates how the Seamer, Pre-Seamer and Hand Crimper should be staged.



The R9 vice grip clamps will also be needed to attach braces on the end of the pick to stabilize the sidewall of the pick during lifting. Sufficient clamps must be staged in the assembly area to accommodate both assembly and lifting. Three clamps should be staged on each end of the Pick, and 1 clamp every 2 to 4 foot of panel length. The clamps for joining panels will be placed around the curved panel on the ground.

Clamps have a tendency to migrate from the assembly area to the erection area. The assembly crew should keep a close eye on the clamps and when necessary retrieve those that have ended up on the building or in the erection area.

7.1.5. Power Source

Many of the tools used to construct a building require an electrical power source. The MIC-75 provides power from the welder that can be used for this purpose. The UBM-240 has an optional portable generator with it. If the Optional power sources were not purchased with your system, you will have to provide a temporary power drop to the construction site or obtain portable generators.

The assembly area and the erection areas require power for seaming operations. One generator can provide power to both areas, however, it will require extensions cords long enough to place the generator within the flow of work.

The following tools will require an electric power source.

Assembly Area

- Pre-Seamer
- Seamer
- Drills/Screw Shooters
- Lights, During Night Operations

Erection Area

- Seamer
- Electric Hand Shear
- Drills/Screw Shooters
- Lights, During Night Operations

Caution: In very long extension cords sufficient power loss may exists to cause damage to electrical motors. Ensure that cords are properly sized for the equipment and distance the equipment is from the power source. The Generator manufacture will be able to provide the necessary specification to make these judgments.

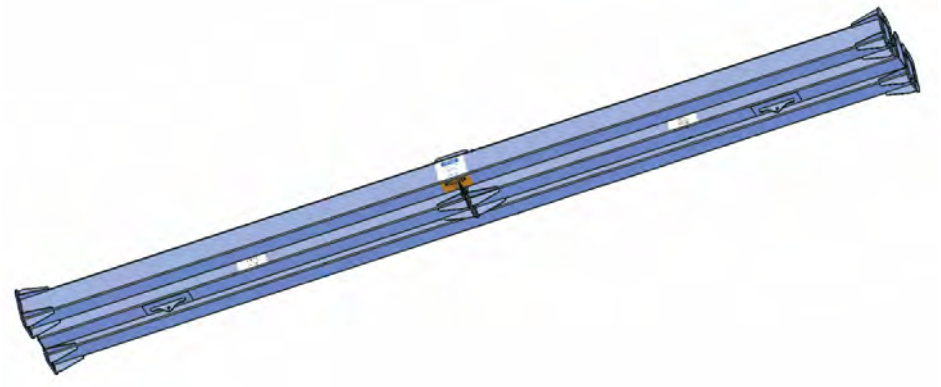
Care must be taken to ensure electric cords are in safe condition. With use the rubber insulation coating on these cords may become cut or damaged and could expose conductors that would pose an electric shock hazard to workers. Inspect all electric extension cords with sufficient frequency to eliminate this hazard. Replace or repair damaged cords as soon as cuts and worn spots are discovered. DO NOT allow extension cords or generators to sit or lay in water while in use. This could cause electric shock to personnel or damage equipment being used.

7.1.6. Lifting Assembly Preparations

After picks are assembled they must be lifted and placed on the foundation. These picks, while strong building panels when setting on the foundation, are fragile when being lifted. The picks are built lying horizontally and must be lifted vertically in order to set them on the foundation. The pick undergoes some flexing and turning during this lifting process. To prevent damage to the pick the lifting devices must be attached to the panel at the proper locations. This provides an even distribution of the load and prevents one area from becoming over stressed. The UBM 240 pick is always lifted with a four point hookup, but the spacing between these hookups is determined by the size of the building. The configuration of the lifting bar is also determined by the size of the building.

The lifting rigging components are as follows:

Lifting Bar; this bar comes in a maximum of four sections. One of the two large center sections can be used alone for smaller building or can be connected to the others sections to create a much longer bar for lifting larger buildings.

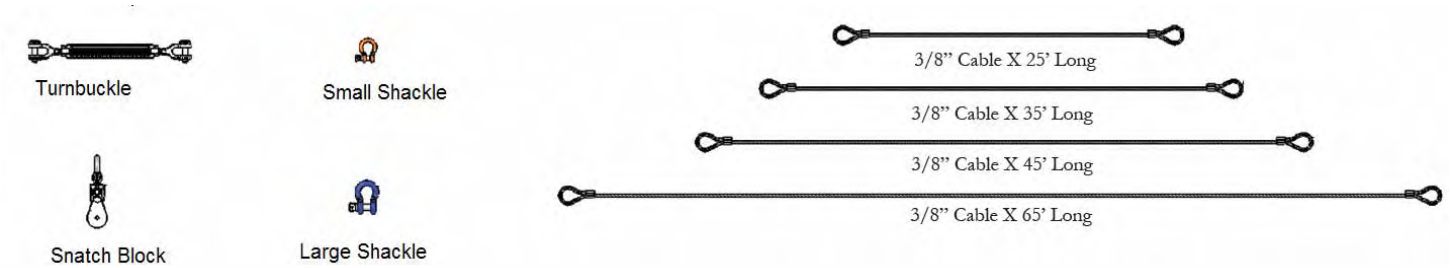


Two part wire rope sling; the system has two of these slings that connect the lifting bar to the crane. One sling is 18' long and a second on 25' long. A three part (three legs coming of the lifting eye) is the third upper sling. It is used for the largest building and only when all four bar sections are bolted together to create the longest bar. The center leg of the sling is only intended to keep the bar level and prevent damage to the bar, it is not intended to carry the load of the pick. A turnbuckle is part of the center leg and allows tension to be increased or decreased on the bar, allowing more or less of the load to be carried.

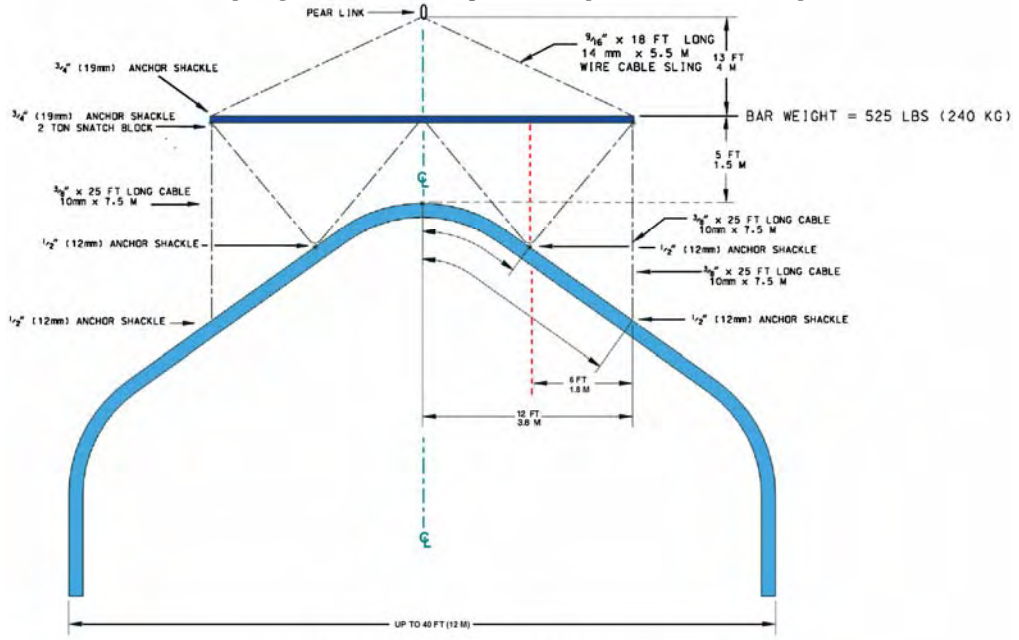
Main Slings

Single main sling wire rope; The lifting rigging system comes with pairs of single main slings. The slings attach the lifting bar to the pick. The system has 4 pairs that are different lengths. The smallest is 25' long this pair is used with the single center section bar. The next size is 35' long, this pair is used with a 3 section bar using the inside hookup points. The next larger size is 45' it is used with the 3 part bar using the outer most hookup points. Last is a 65' pair, this pair is us with the largest bar configuration, a 4 part bar, two center sections and the two end sections.

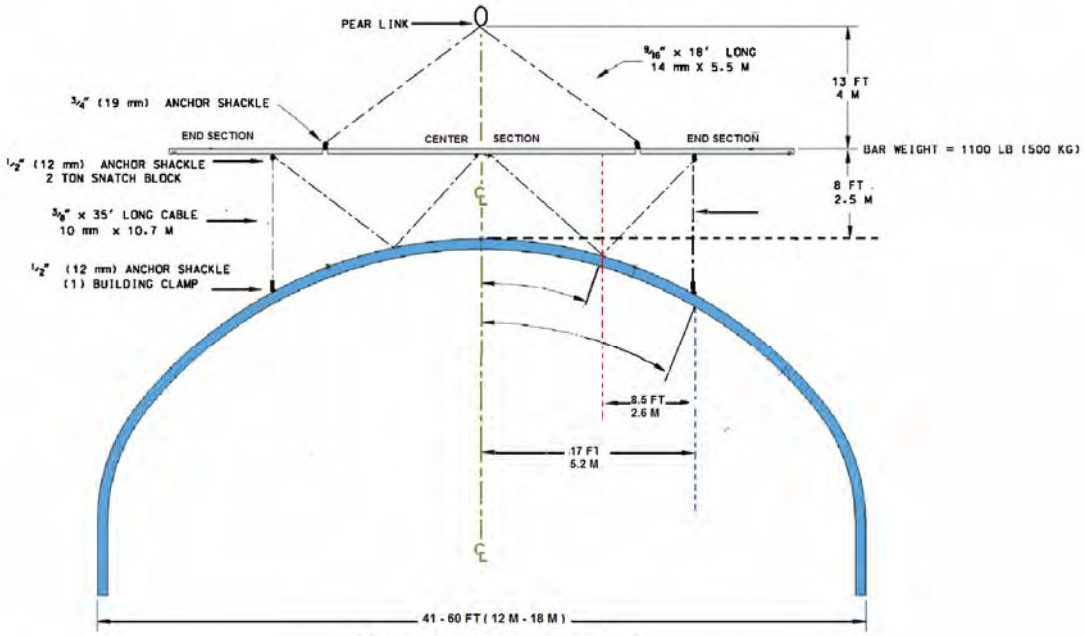
Shackles and Snatch Block Pulleys; These devices are used to create swivel points along the single main slings so that the load will level it self out after being lifted and create a evenly distributed load on the lifting bar. Larger shackles are used on the two part main sling to attach the sling to the bar.



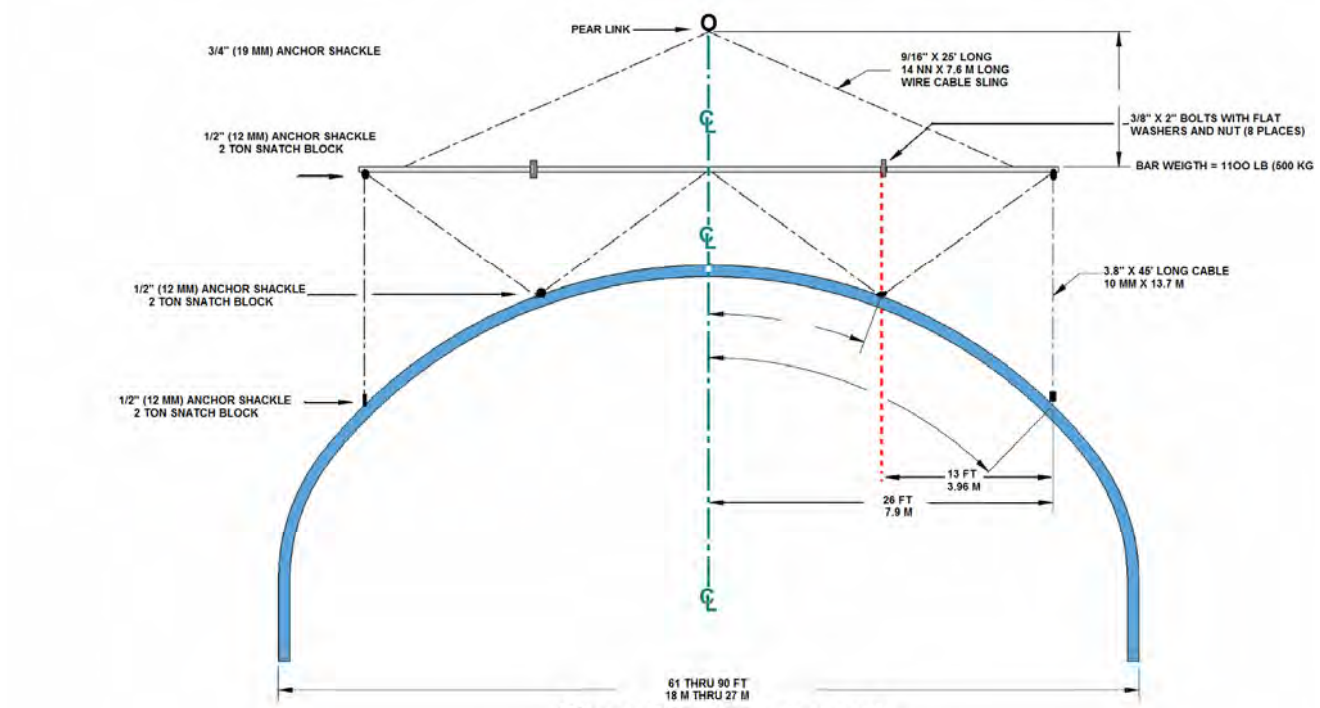
The following diagrams show the required configuration for the lifting bars for various size buildings.



Single Bar Arrangement

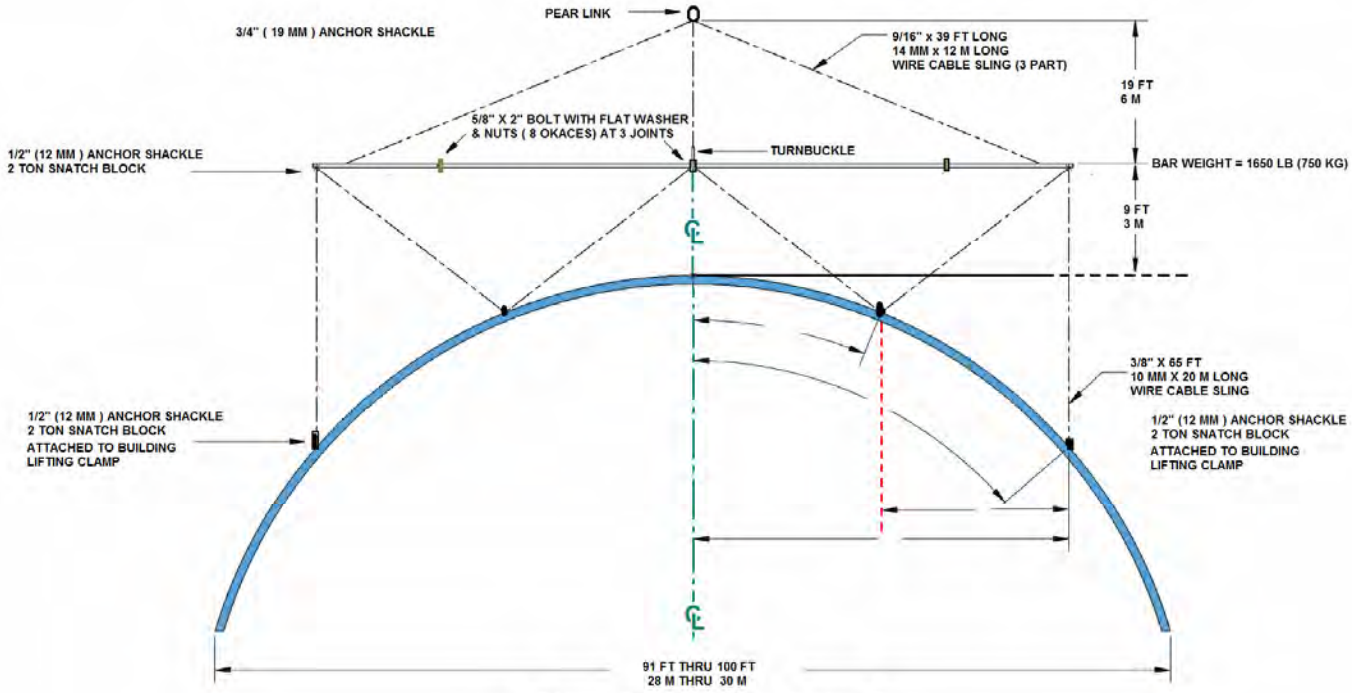


Three Bar Arrangement
Inner Lifting Points



Three Bar Arrangement

OUTER MOST LIFTING POINTS

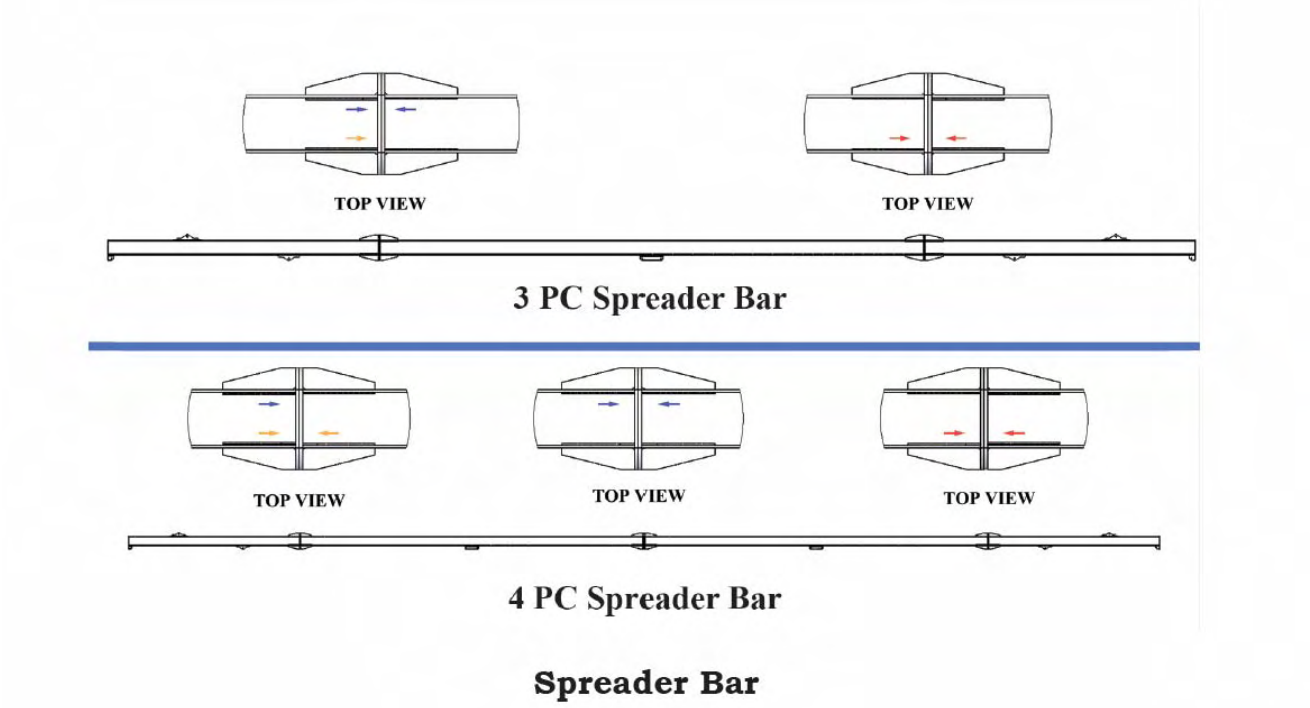


Four Bar Arrangement

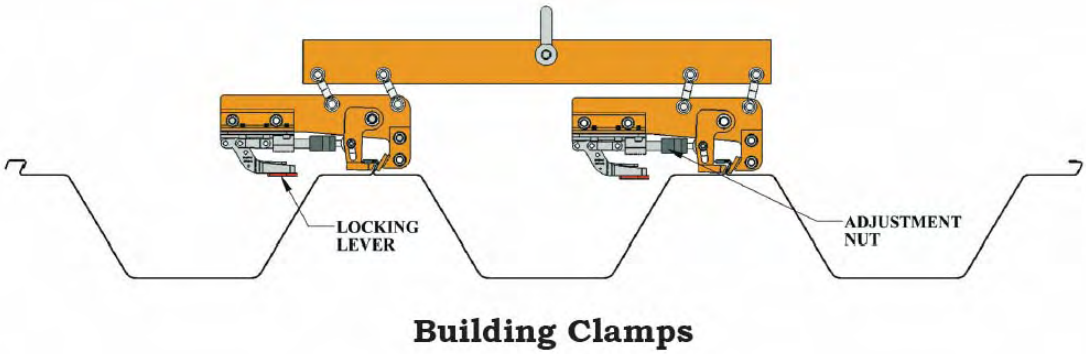
FOR LARGEST SIZE BUILDINGS

Building Shape	Building width	Lifting Arrangement	Main Sling (2 part or 3 part)	Lower Lifting Sling (Single)	Total Drift	Center Measurement	Intermediate Measurement	Notes
CIRCULAR	30-35 FT 9-16.7 M	1 PART BAR	18 FT 5.5 M	25 FT 7.5 M	18 FT 5.5 M	12 FT 3.8 M	6 FT 1.8 M	
CIRCULAR	36-75 FT 17-22 M	3 PART BAR INNER LIFT	18 FT 5.5 M	35 FT 10.7 M	21 FT 6.5 M	17 FT 5.2 M	8.5 FT 2.6 M	
CIRCULAR	76-95 FT 22.9-29.0 M	3 PART BAR OUTER LIFT	25 FT 7.6 M	45 FT 13.7 M	18 FT 5.5 M	26 FT 7.9 M	13 FT 3.95 M	
CIRCULAR	95+ FT 29.1+ M	4 PART BAR 3 PART SLING	39 FT 12 M	56 FT 20 M	28 FT 9 M	38 FT 11.75 M	19 FT 5.88 M	
TWO RADIUS	30–50 FT 9–15.4 M	1 PART BAR	18 FT 5.5 M	25 FT 7.5 M	18 FT 5.5 M	12 FT 3.8 M	6 FT 1.8 M	
TWO RADIUS	51–64 FT 15.5–19.7 M	3 PART BAR INNER LIFT	18 FT 5.5 M	35 FT 10.7 M	21 FT 6.5 M	17 FT 5.2 M	8.5 FT 2.6 M	
TWO RADIUS	65-89 FT 19.8-27.3 M	3 PART BAR OUTER LIFT	25 FT 7.6 M	45 FT 13.7 M	18 FT 5.5 M	26 FT 7.9 M	13 FT 3.95 M	
TWO RADIUS	96+ FT 21.9+ M	4 PART BAR 3 PART SLING	39 FT 12 M	56 FT 20 M	28 FT 9 M	38 FT 11.75 M	19 FT 5.88 M	
GABLE	30–50 FT 9–15.4 M	1 PART BAR	18 FT 5.5 M	25 FT 7.5 M	18 FT 5.5 M	12 FT 3.8 M	6 FT 1.8 M	
GABLE	51–64 FT 15.5–19.7 M	3 PART BAR INNER LIFT	18 FT 5.5 M	35 FT 10.7 M	21 FT 6.5 M	17 FT 5.2 M	8.5 FT 2.6 M	
GABLE	65-89 FT 19.8-27.3 M	3 PART BAR OUTER LIFT	25 FT 7.6 M	45 FT 13.7 M	18 FT 5.5 M	26 FT 7.9 M	13 FT 3.95 M	
GABLE	96+ FT 21.9+ M	4 PART BAR 3 PART SLING	39 FT 12 M	56 FT 20 M	28 FT 9 M	38 FT 11.75 M	19 FT 5.88 M	

The lifting bar can be assembled by laying the sections on the ground and sliding the sections together then installing the bolts. The sections are color coded at each end with arrows. Alignment of the arrows is important since they allow the spreader bar to be in the most balanced and straight position. Use 5/8" x 2" bolts with flat washers that have been supplied in the small red box that can be found in the rear storage compartment of the UBM-240 machine. Install and tighten all eight bolts at each connection.



The last component of the lifting assembly is the building lifting clamps. These devices are attached to the pick at the predetermined location. The location is determined by the size of the building in relation to the configuration of the lifting bar.



7.2. Assembly

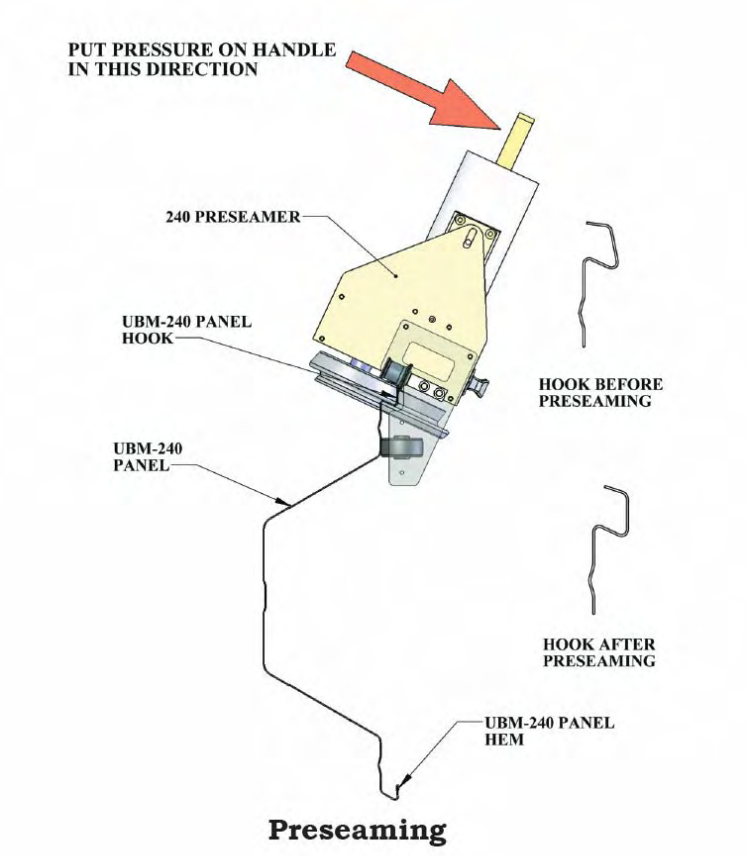
With the UBM-240 setup and producing and curving building panels a crew will need to assemble the panels on the ground into picks. A pick is three building panels seemed toghter into a section that will be lifted and set on the foundation.. A pick will cover approximately 6 ft (1.83 m) of building length. The steps in building are listed below.

- Panel carriers move a panel from the inspection area to the assembly area.
- The assembly crew Pre-seamer the panel.
- The assembly crew places tab in the marked locations.
- The panel carriers bring the second panel and sets in on top of the 1st panel.
- Under the direction of the assembly crew leader the panel carriers aligns the 1st and 2nd panel.
- The assembly crew clamps panels 1 & 2 together.
- The panel carriers' returns to the production area, the assembly crew hand crimp a section panel for a seamer starting area.
- Assembly crew seams panels 1 & 2 together.
- Assembly crew places tabs in the marked location.
- Assembly crew pre-seams panel two.
- Panel carriers brings panel 3 to the assembly area, they set the panel down waiting pre-seaming.
- Assembly crew pre-seams panel 3.
- Panel carriers' lifts and sets panel 3 on panel 2.
- Assembly crew Clamps panel 2 & 3 together.
- Panel carriers' returns to production area.
- Assembly crew hand crimp seam. For Seamer starting area.
- Assembly crew seams panels 2 & 3 together.
- Assembly crew and erection crew install panel brace for lifting and connect the lifting building clamps.
- Crane lifts picks and moves over foundations and sets it.

When stacking one arch on another take caution to ensure you do not accidently place it incorrectly and allow it to fall over the arch you are setting it on. This could cause injury to a member of the panel carrying crew. Also ensure the panel carrying crew members do not walk away from the arch until it is completely secured with the 9-r clamps.

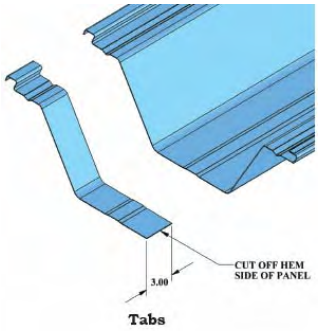
7.2.1. Pre seaming operations

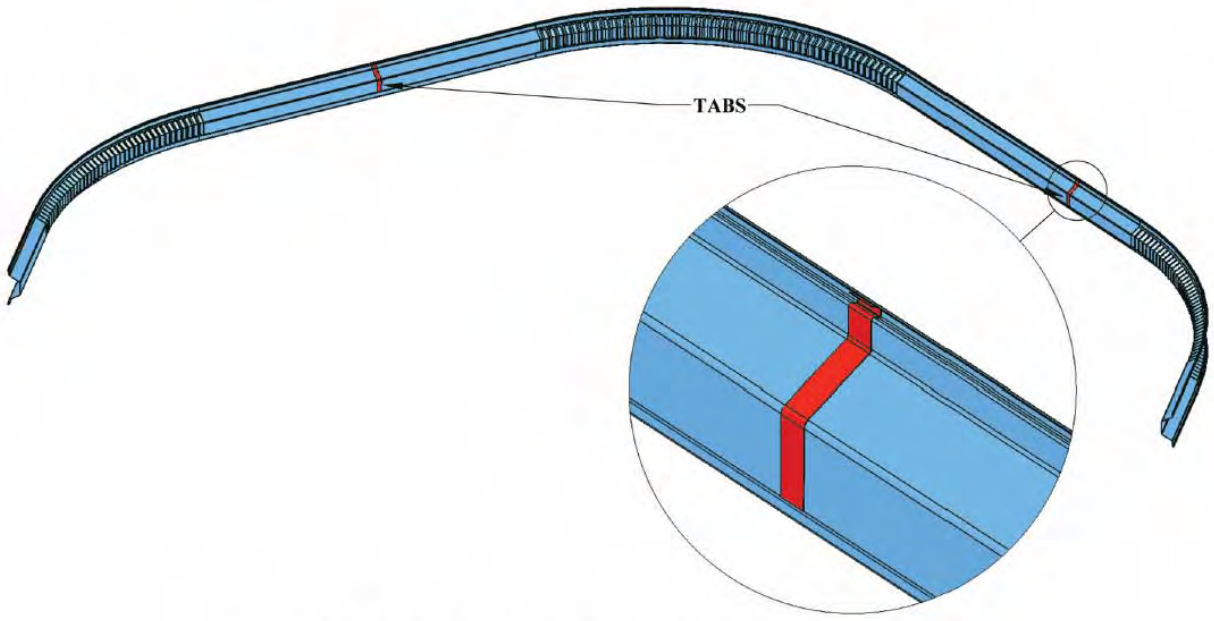
The assembly crew will pre-seam every panel that comes to the assembly area. During the manufacturing process the hook of the panel becomes deformed as a result of curving process and the pre-seaming machine will correct this deformity. Start the pre-seamer operation at the very end of the panel and put pressure in the direction of the arrow. The pre-seamer well re-bend the hook section of the panel as shown below. The pre-seamer may be used on any size or shape panel but must be used on any panel with a radius below 21 foot (6.4 m).



7.2.2. Tab Placement

All panel coming into the assembly area will have reference marks on them, the assembly crew will refer to these marks for Tab Installation and to identify lift locations for erection crew to attach the building lifting clamps to the pick. Tab location will be marked with a "**T**". The lifting points will be marked with an "**L**". The center of the panel will be marked with a "**¢**". This mark will be for the erection crew to help line up the pick when the pick is lifted and sat on the foundation. All reference marks will be placed on the panel by the Machine crew. All Marks will be placed on the Hook of the panel so it can easily be seen from either side of the panel





Placing the Tabs on the Panel

7.2.3. Stacking and Clamping

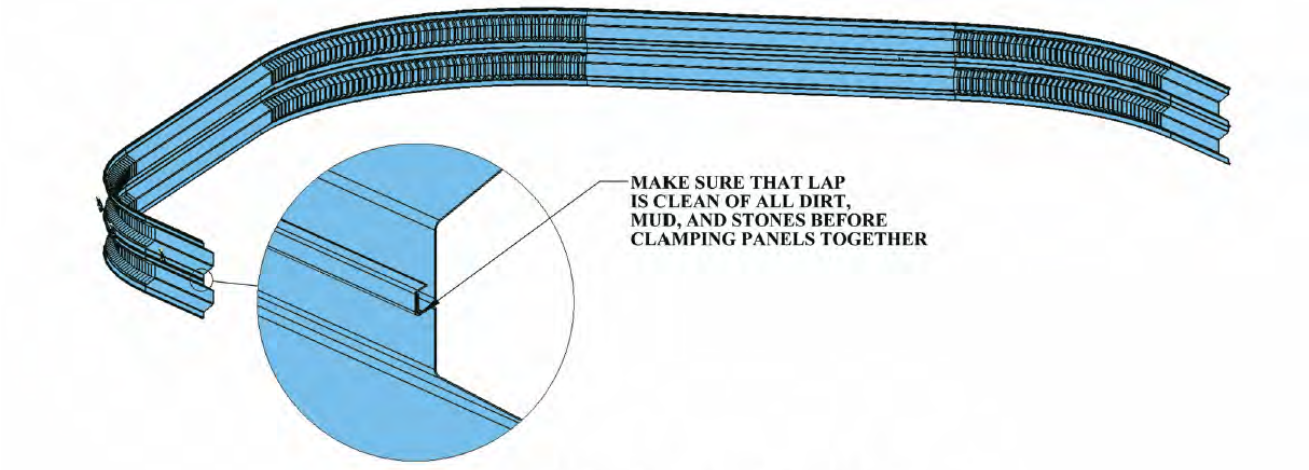
As each panel is manufactured by the machine crew, the panel carriers will deliver the panel to the assembly area. The panel carriers guided by workers in the assembly crew will place the HEM of the panel being carried into the Hook of the previous building panel.

The panel carriers must lift and carry the panel as a team, they must work together and make even and smooth motions. Each person must carry his own weight, one crew member lifting to high or low will cause a uneven weight distribution and could cause some one to lift two much weight and be injury as a result.

When stacking one arch on another take caution to ensure you do not accidently place it incorrectly and allow it to fall over the arch you are setting it on. This could cause injury to a member of the panel carrying crew. Also ensure the panel carrying crew members do not walk away from the arch until it is completely secured with the 9-r clamps.

Should a panel slip over the top of a pick, DO NOT try to catch the panel, QUICKLY step back and get out of the way, LET THE PANEL FALL. The crew can then pick up the panel move it back around the panel on the ground and seat it in the proper position again.

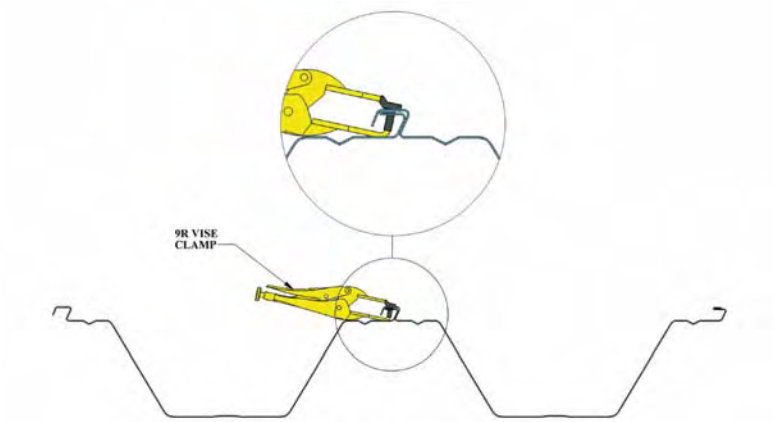
It is the responsibility of the assembly crew to ensure that the panels are properly aligned with the panel it is being seated with. The seaming starting end of the panel should be the end that is aligned. The crew must keep the panel tight in the seat while they slide slowly in the proper direction until the ends of the panels are aligned.



Aligning the Panels

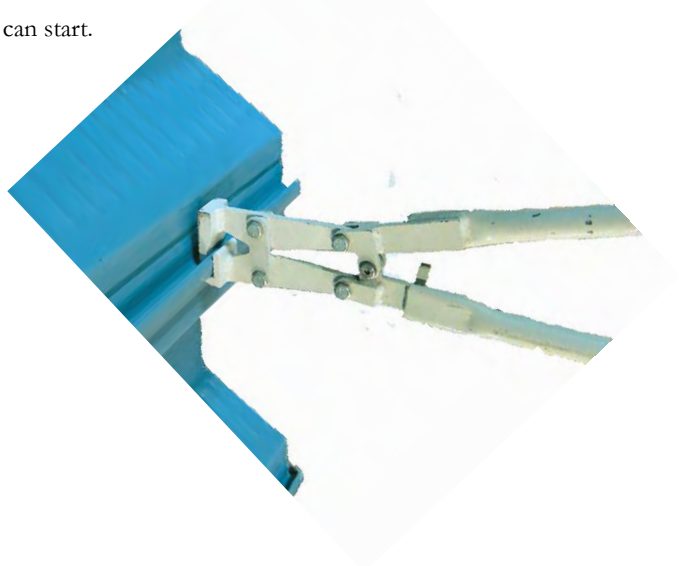
The panel carriers will hold the panel in place until the assembly crew secures the two panels together by attaching the R-9 vice grip clamps.

The assembly crew will start at the aligned end of the panel and clamp around the panel placing a clamp every 2 to 4 ft (.61 to 1.21 m) apart. The radius sections of the panel may require more camps and closer together than straight sections. The goal of clamping is to bring the hem of one panel tight and well seated into the hook of the other panel prior to seaming. If additional clamps are needed at closer intervals to get a good tight fit between the Hem and Hook that is fine. Importance is the tight fit of the seam.



Clamping Procedure

Before the panels can be seamed a section about 12" (30.48 cm) long must be crimped by hand using the Hand Crimper. This creates a point for the seaming machine to be mounted on to the panels so the seaming can start.



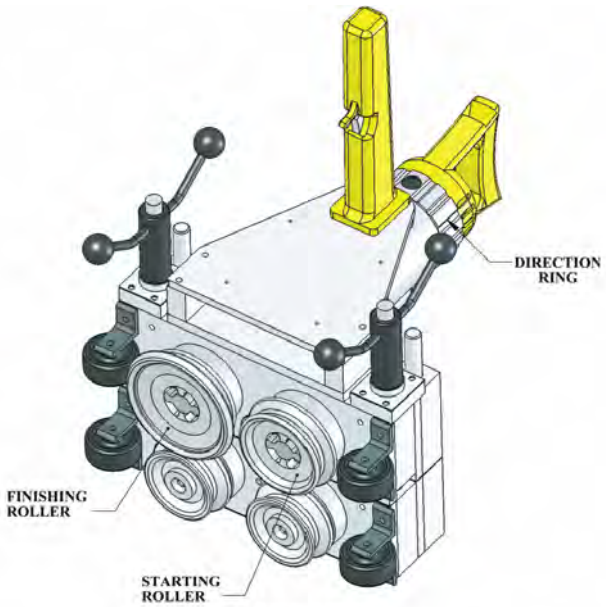
7.2.4. Seamer Operation

The seamer can be powered by the auxiliary portable generator, the UBM's onboard generator, MIC-75 welder or any other suitable power source.

The seamer unit is reversible; depress the seamer switch to ensure that the proper direction has been chosen.

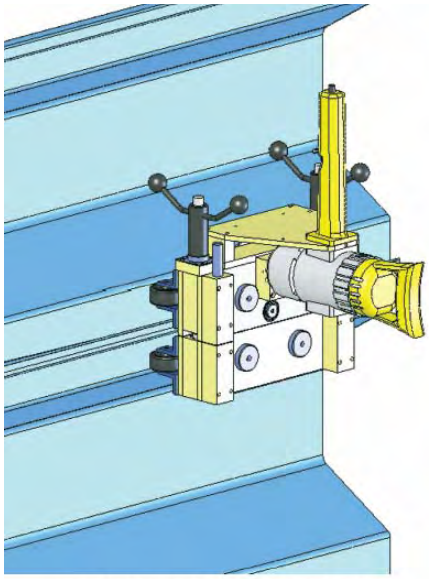
Two of the seamer rollers are reversible, simply turn the roller ¼ turn and pull the roller outward to remove it. Some models may have a spring assisted roller. Simply push in on the roller before turning it ¼ turn to properly remove the roller. The lead roller is the SMALLER diameter roller. It needs to be the first roller to impact the panel.

Then tighten the T-Handle on the seamer with moderate force and depress the seamer trigger. The seamer will start the seaming process. By tightening the T-Handles the operator can achieve the desired seam. As the seamer is moving have another worker remove the clamps just before the seamer reaches that point. It is best to keep the seamer moving until the entire seam is complete. The worker assisting with the clamps will help the seamer as it run off the ending edge of the seamed panels.

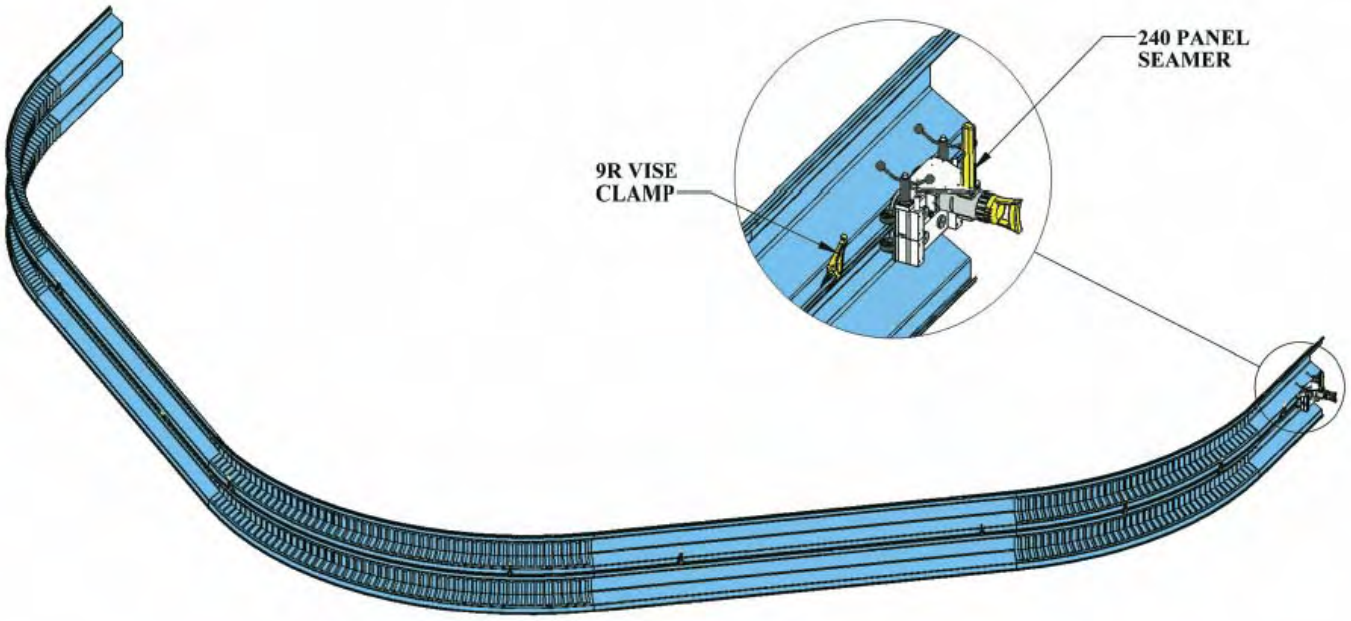


UBM-240 Seamer Unit

During seaming operation ensure the electrical cords (seamers, pre-seamers and extension cords) do not get caught or hung up causing electrical damage to the equipment



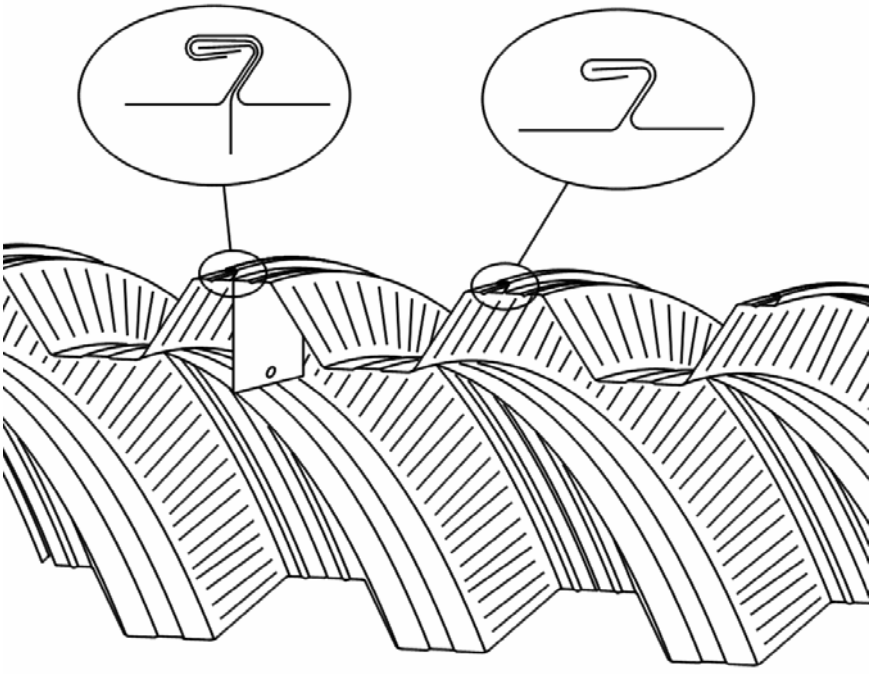
Seaming the 240 Panel

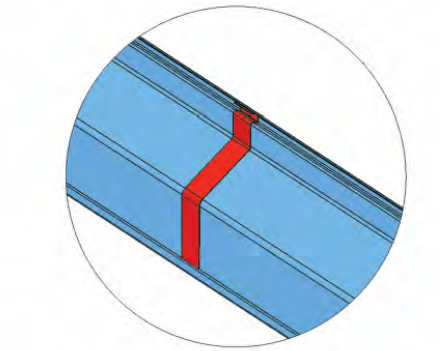


A Gable Panel being Seamed

The operator should place the seamer on a pallet or a piece of metal or wood to keep the seamer out of the dirt. The operator should open the seamer change the rollers for the opposite direction and change the motor direction so it is ready to use on the next seam. Because of the hard working environment the seamer is the piece of equipment that requires the most maintenance in order to keep it in good working order.

Seamer operator should not wear gloves when handling the seamer. The seamer could catch the glove and pull your hand into the seamer and cause serious damage.

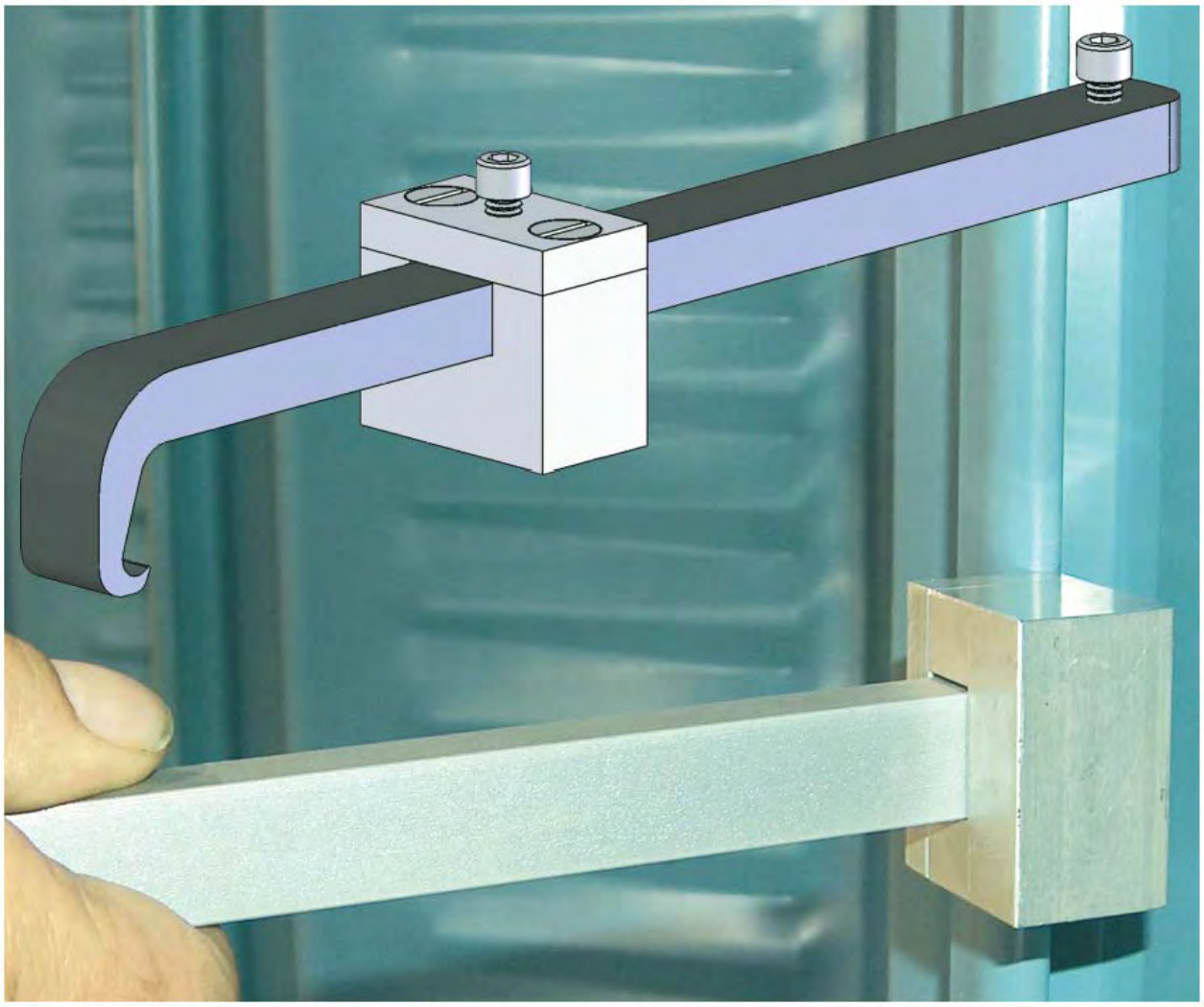




The areas where Tabs are placed may have to be hand crimped using the manual hand crimper before the electric seaming machine is passed over the tabs. This will depend on the steel thickness.

Occasions may occur where a panel will have to be removed after the seaming is complete. To accomplish this task a hand de-seaming tool is available, the tool works much like a manual can opener. Hook the tool over the hook of the panel and pry down. This will pull he seam open.

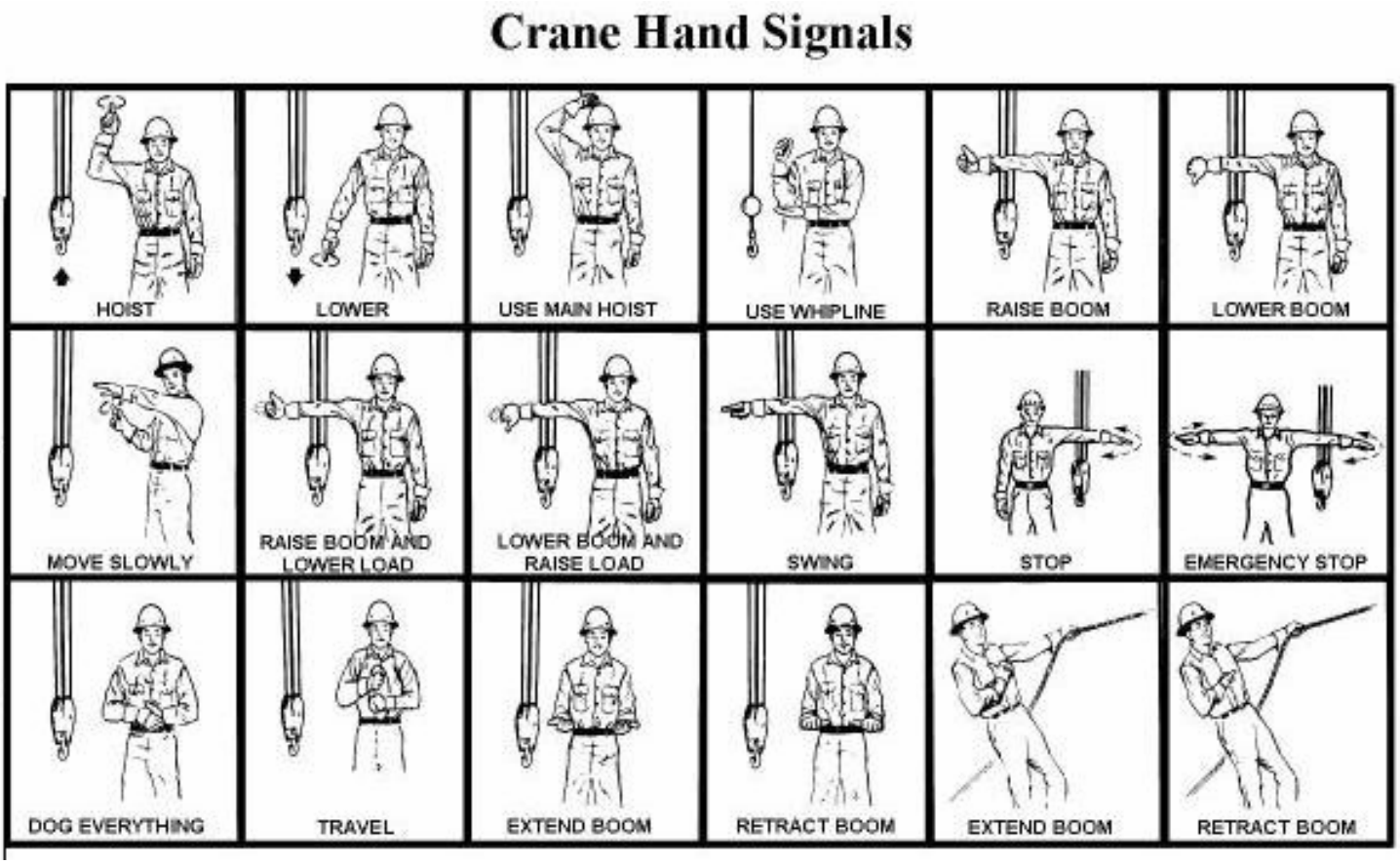
A building can only be un-seamed and re-seamed once. If multiple de-seaming operations are performed the hook portion may shear off the panel, similar to bending steel back and forth until it shears.



De-seaming Device

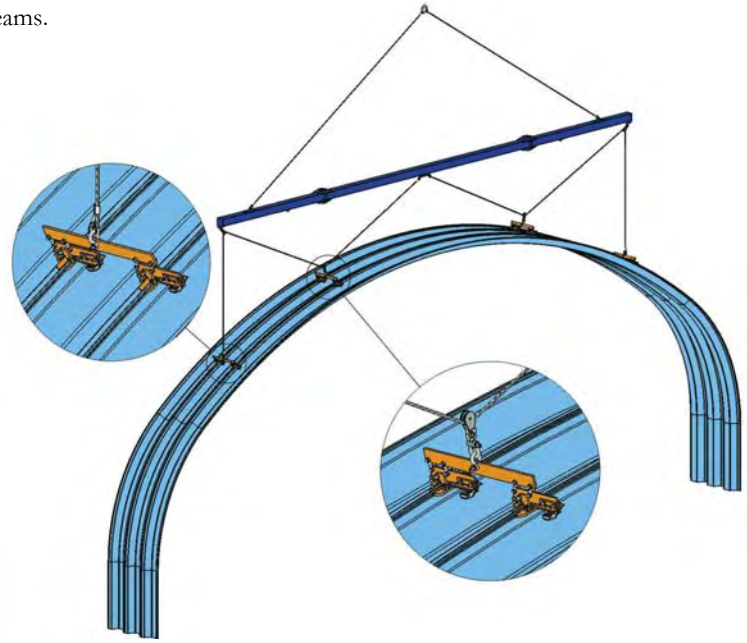
7.3. Rigging and Lifting

During the construction of UBM buildings, a crane is used to move heavy materials. The most important function while working with a crane is coordination between the crane operator and crane guide. Only ONE person will be designated as the Crane Guide and all crane movements will be directed by that designee. The crane guide will ensure all workers are aware of all pending actions prior to the movement of the crane, NO MATTER HOW SMALL. The crane guide and crane operator will be instructed on standard hand signals before any crane operation will begin.



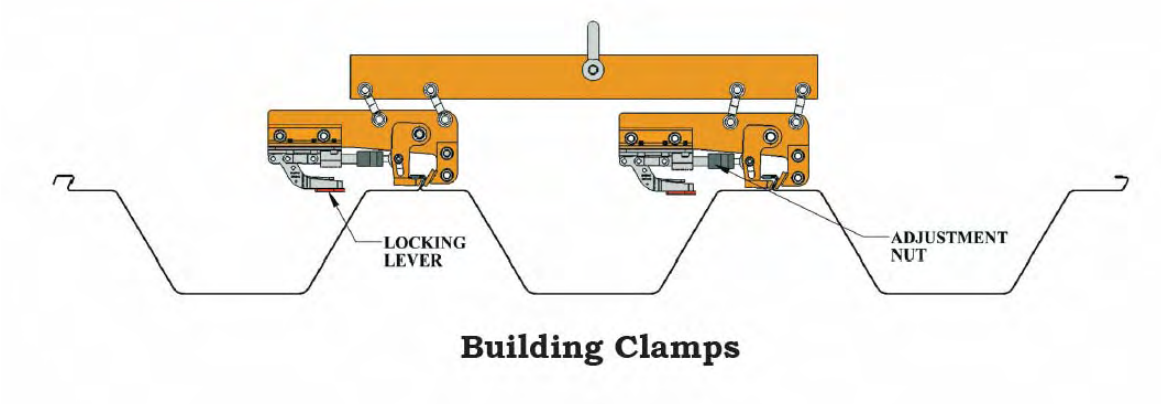
7.3.1. Lifting Bracket Adjustment and Attachment

In order to lift a PICK, four lifting brackets need to be attached at the indicated (L) lifting points. The lifting brackets are provided with the UBM. The brackets are adjustable for different widths of panels and they will need to be inspected and adjusted to provide a tight (no slippage) connection to the seams.



LIFTING CLAMP PLACEMENT

To adjust the brackets, they must be in the unlocked position. At each connection point (2 per lifting bracket) there is a clamp with an adjustment nut. When connecting the bracket to the panel, either screw this nut in to loosen or out to tighten the clamp. Adjustments may need to be done periodically to accommodate different steel thicknesses.



Building Clamps

7.3.2. Stabilizers (2x4's)

It is highly recommended to attach a lifting/stabilizer bar (2x4) to the end of the PICK prior to lifting. This stabilizer will be useful in many ways. It will keep the ends of the PICKS from being distorted and provide the erection crew a solid, secure, and safe place to handle the PICK during lifting. It also keeps the PICK in a nice straight line which assists in the placement of the PICK onto the angle iron. The stabilizer allows you to push or pull the PICK evenly instead of fighting the flexibility of the three separate panels in the PICK. The stabilizer should be attached approximately 3 ft. (.914m) from the base of the PICK.

STABILIZER 2x4

7.4. Erection

PICK erection is one of the most dangerous functions in the construction process. Personnel Protective Equipment (i.e. gloves, hard hats, and safety toed boots) must be utilized while on the construction site. While lifting a PICK, workers must be aware of inherent hazards associated with handling and moving it. During the lifting process, workers need to move uniformly with the PICK as it is transferring from the vertical position to the horizontal position and ensure the lifting brackets maintain a secure connection. If the lifting bracket disengages, quickly move away from the PICK and keep hands and feet from the bottom edges. During movement of the PICK, workers must be aware of their surroundings as not to hit objects on the work site and observe footing around the foundation when placing the PICK. Once the PICK is placed and is being secured, falling hazards from R-9 clamps need to be observed. Clamps could come loose and fall. If this occurs, yell "CLAMP", DO NOT LOOK UP, and step away from the structure. If the clamp is falling along the belly of the panel, it is best to move to the side opposed to directly in front of it. The clamp may bounce directly away from the panel and into a worker on the ground.

PICK ERECTION

The erection crew must know the exact location the first PICK will be placed. The starting location should be clearly marked or identified on each side of the foundation. The first PICK is the most critical requiring extra attention and time when being placed. Proper placement of the PICK will result with the belly of the first panel or channel aligned with the end wall angle iron.
Prior to lifting the first PICK, the crew must attach guy ropes to predetermined tabs for anchoring once moved into place. Prior to lifting the second PICK, the crew must attach the Fall Restraint System.

In some conditions, i.e. Air to Air design, additional guy ropes may be needed to tether to the PICK to allow the ground crew to handle the PICK. This is a situation where the base of the PICK is lifted above the reach of the ground crew.

7.4.1. PICK Placement

The Erection process starts with lifting the first PICK from the assembly area. It is lifted and turned so the HOOK is facing in the opposite direction you are building and the HEM is in the direction you are building to. ALWAYS build with the HEM facing the direction you are building. Workers on both sides assist in guiding the PICK as the crane swings it into position and lowered onto the angle iron.

CAUTION: While the ground crew is moving the PICK, the objective is only to guide it. DO NOT try to hold or pull down the ends for any reason. This could cause the entire PICK to fold or collapse at the center, creating a safety hazard for the erection crew. The PICK will also be damaged and unusable. The ends of the PICK are extremely sharp; keep hands and feet clear of the edges. Do Not attempt to erect PICKS in winds greater than 20 MPH (32 Km/hr) or when potential wind gusts exist.

