Module 2 - Unloading, Material Handling, and Staging

Chapter 1

During this module, you will learn the proper way to prepare for delivery of your metal building, how to safely unload that building, how to organize the storage of building components, how to move those building materials around your job site, and how to stage materials to begin framing. The first step in preparing for the delivery of your building is to do a site survey.

During that survey, take a look at the access to your building site to make sure everything is in place before the truck or trucks carrying your building arrive. Determine the best highway or road that the vehicle transporting your building parts will use to access the job site. Make sure ahead of time that there are no obstructions overhead or on the ground and that the access road is graveled or planked if the ground cannot support the heavy weight of the truck. Consider the weather forecast for the anticipated day of delivery. What is the likelihood of rain or snow? How will this impact the route of the truck? What does the ground look like now? Are there any muddy or other areas such as soft grass that could cause the truck to sink or get stuck? Take a walk around the job site. Are there any telephone lines, power cables or other hazards that are in the way? How much clearance will your truck need? Once the truck arrives at the site, you may not have the time or equipment to clear any items that could interfere with the truck delivering your materials.

Your supervisor will most likely talk to the general contractor to coordinate the delivery date of the building and the conditions of the site that will be expected by the metal building erection crew. Take a look at the terrain you will be traveling over. Make sure you have a clear path to where you'll be unloading materials. Uneven terrain can cause the load to shift. Determine if you will need any ramps built up to reach the slab. Are there any ditches, holes, curbs, or railroad tracks that may cause a problem?

Now that we have all the needed information, take a few minutes and look at the site while you imagine the truck arriving and how your material, equipment, and personnel will be moving on the job site. Each building comes with a set of construction drawings. Each plan for unloading, storage, and staging should be specifically prepared for that building and should be strictly adhered to. You and your crew members should be familiar with these plans prior to starting. Once we have carefully looked over the building drawings and specs we will be able to determine the material handling equipment we will need for this particular job.

The type and size of lifting equipment you will need is determined by the size of the building and the site considerations. Length of boom, capacity, and maneuverability of lifting equipment will determine its location for both unloading and installation. Make sure your unloading and lifting equipment has the proper lifting and rating capacity. You don't want to use equipment to try and lift materials that are outside of the safe operating range determined by the manufacturer. You should plan to use the same lifting equipment to unload and complete the framing stage. By combining the unloading process with framing you can usually reduce your lifting equipment costs. You are going to need straps for unloading and moving your material as well as steel chokers. Spreader bars are needed to handle some very heavy materials and they are available with different weight capacities. When lifting long materials it is a good practice to use a rule of one-thirds to rig the load. For instance, if you are lifting a bundle of panels that are 30 feet in length you would rig the two pick points with a spreader bar at 10 feet from each end. This assures that the load is divided equally in thirds. Make sure these items are scheduled for the day of unloading and assure that they will be in good working condition. Having a strap break or choker come loose because it is in poor condition is dangerous. Make sure your unloading and moving equipment are not in question. If they are, replace them. On all but the smallest jobs, it is a good idea to have at least two sets of rigging equipment so as one load is being moved from the truck to storage or staging another can be rigged.

Chapter 2

Let's look now at the process of planning for storage and staging of building materials. You need to plan out where everything is going to go, especially when space is limited at the job site. This will involve careful, safe and orderly moving, storage, and staging of all materials. Think ahead about where to put your materials so you can avoid having to move things twice. Having to keep moving material around will cost both time and money. You're going to want to store the materials in the logical order you will be using them in during installation. You do not want to be climbing over something to get to the parts you need or have to move everything to get at a material once your building is started. Look at the path from where the truck will be parked to where your building site and storage area is. Make sure there are no obstructions in the way such as pipes, clothes, or other objects that can cause you or others to be trapped while the truck is moving or unloading. Take a look around the site and remove these items or make a note of their location and mark them clearly so you can avoid them and prevent injury.

Chapter 3

In this section, we will look at safety considerations. Having a comprehensive safety awareness program in place to familiarize you and your workers at your site with unique conditions of the site in advance is important. Along with the appropriate safe work practices that will be utilized.

Each crew member is responsible for showing up on time, dressed in the proper clothing and wearing the required and customary personal protective equipment. This will include hard hat, safety glasses, steel-toed boots, and gloves.

Only properly trained operators should ever operate the material handling equipment. Both the equipment operators and the personnel reading the materials for unloading need to be completely aware of their surroundings at all times to avoid getting trapped by shifting loads or pinched or even crushed by material handling equipment. Remember that both the riggers and the equipment operators are responsible for the balance of loads in transit. You need to use extreme care when locating and using lifting equipment to avoid contact with power lines.

Remember power lines can kill, so take the time to locate them and avoid them.

Chapter 4

In this section, we will take a look at the hand signals you will need to know and the procedures to move your material safely with a forklift or crane. A signal person should stand near the point where the load is going to be placed. Only one person should be designated as a signalman to avoid any confusion. The following forklift and crane hand signals should always be reviewed by the spotter and operator prior to unloading to avoid damage to materials, bodily injury, or even death.

To signal a normal stop, extend your arm, with your palm facing down and hold that position rigidly.

To signal emergency stop, extend your arm, palm facing down and move your hand rapidly right and left.

To signal to raise the load, extend your forearm vertical with your forefinger pointing up. Now move your hand in a horizontal circle. To increase the hoist speed, speed up the circling motion.

To signal to lower the load, extend your forearm downward with your forefinger pointing down. Move your hand in a horizontal circle. To slow down the lowering speed, slow down the circling motion.

To signal to raise the boom, extend your arm with your fingers closed and your thumb pointing upward.

To signal to lower the boom, extend your arm with your fingers closed and your thumb pointing downward.

To signal dog everything, which means stop everything, clasp your hands in front of your body.

To signal to extend the boom while using a telescoping boom, with both fists in front of your body extend your thumbs pointing outward.

To signal to retract the boom while using a telescoping boom, with both fists in front of your body extend your thumbs pointing toward each other. This is the signal to use the main hoist. You can also tap your head with your hand. This is the signal to use the whip line. You can also tap your elbow with your hand.

To signal to raise the boom and lower the load, extend your arm with your thumb pointing up. Flex your fingers in and out as long as the load movement is desired.

To signal to lower the boom and raise the load, extend your arm with your thumb pointing down. Flex your fingers in and out as long as the load movement is desired.

To signal to travel while on the ground if using a hoist, use both hands or your fists in front of your body making a circular motion around each other.

To signal to travel during driving, extend your arm forward with your hand open and slightly raised making a pushing motion in the direction of travel intended.

To signal to move slowly, use one hand to give the motion signal and place the other hand motionless over that hand. This example is to lower slowly.

To signal to retract the boom using only one hand, raise your fist in front of your chest with your thumb pointing outward and the heel of your fist tapping your chest.

To signal to extend the boom using only one hand, raise your fist in front of chest with thumb tapping chest.

To signal to swing crane right, extend your arm with fingers and thumb flat to the right.

And finally the signal to swing crane left, extend your arm with fingers and thumb flat to the left.

When you are giving signals to a forklift operator there are four additional hand signals that you will need to learn. They include: If you need the operator to extend the forks, point two fingers on one hand toward yourself.

The signal to retract the forks is pointing two fingers with one hand towards the operator.

The signal to tilt the forks up is to extend your arm with your fingers closed and your thumb pointing outward rotating your wrist from the 9 o'clock position to the 12 o'clock position.

The signal to tilt the forks down is to extend your arm with your fingers closed and your thumb pointing outward rotating your wrist from the 9 o'clock position to the six o'clock position.

Chapter 5

When the truck arrives on the site take a close look at the trailer bed and material load before you begin to direct the truck to where you will be unloading the material. You need to make sure that the load is safely secured so when the truck comes on to the site you will not get hurt from material falling off the truck or having something get caught on the trailer and damage your material. After we have done a walk around and determined the load looks secure we can have the truck positioned in the designated unloading location.

Let's take a look at the receiving procedures you will need to know. Take a look at the shipper's manifest. Make sure the manifest job address matches your job site. Take some time to more carefully inspect the material for any damage that may have been caused by shifting loads, over-tightened straps, broken bands, or other factors. Make a note of any damage as you come across it. Carefully check your packing list while unloading. The load manifest confirms inventory for each truck and must be watched very carefully. Now we are ready to unload the truck.

During the unloading process, you should be thinking safety first. On the day of unloading, you need to have ramps in place over footers or up to elevated building pads so the truck with a forklift can gain access to the site. Also, ramps may be necessary to protect the edges of the concrete slab from chipping or cracking due to heavy equipment traffic. On this job, we will be using a Sky Trak 4-wheel drive forklift for unloading the truck. Our operator is trained and experienced in the proper operation of this forklift.

Before you operate a forklift make sure you know how and where you'll travel, turn, pick up, and lift and place loads. Know the weight of your loads and stay within the manufacturer's recommendations to prevent tip over or damage to the load. You should know or be able to estimate the weight and load center of the load you will be lifting. If you are unsure of the weight and load center, check with your supervisor or with the supplier of the material. You should know the rated capacities of your forklift. Refer to the forklift capacity chart to determine the operating range in which you can safely lift, transport, and place the load.

An operator should choose a smooth level route to prevent possible tip over or loss of load. If possible, avoid crossing ruts, ditches, curves, and exposed railroad tracks. If you cannot avoid these conditions, keep the load as low as possible and travel very slowly and with extreme caution. Watch out for overhead power lines. Make sure you know where they are at all times. Avoid transporting loads of loose material if possible. Check that loads are properly banded and strapped together. Remember to keep your loads balanced when moving them.

Here is where things can get out of control if your load is not balanced properly. Driving on slopes or inclines can be dangerous and result in forklift tip over or loss of load. When traveling with a load the front of the forklift is considered the heavy end. Travel with the forklift pointed uphill. Traveling with a load in an elevated position is dangerous and can cause tip over. If you must, make sure to keep the load as low as possible. Travel with extreme caution and at the slowest possible speed. Keep the load level at all times and avoid sharp turns and sudden starts and stops. If the load starts to lean or move while lifting or traveling, lower the load to the ground and reposition it on the forks or restack the load before raising it again. Always spread the forks as wide as possible to prevent the panels from bending. The forks should be at least 5 feet wide. Even with the forks as wide as possible you may need to lift certain loads with a crane or other device to keep from damaging the material.

When lifting bundles of sheeting or trim, use nylon straps to minimize any damage to the material. Make sure bundles are adequately supported as they are placed on the ground. Watch out for shifting loads on the ground around the trailer while unloading.

Pay close attention to your surroundings and make sure the backup alarm on your forklift is operating properly. If it is not, shut down safely and correct the problem before you proceed. Be sure to avoid running the wheels of your equipment over the anchor bolts of the columns on your slab. This can be a costly and time-consuming problem to fix.

Chapter 6

Next, we will look for the proper methods for storage of the unloaded materials. Unless there is visible exterior damage, do not open the crates or boxes and do not remove the protective coatings and covers prior to staging for installation. This may cause permanent damage or future loss to the project. Lay out your storage area by material groups. Take in consideration the sequence of materials required for building erection. Columns and rafters will be used first. Next will be purlins and girts. Make these the most easily accessible. Wall and roof sheeting materials are next. Flashing, trim, and gutters will be used last so they should be set back and out of the way.

Be sure to keep sheeting components well protected from damage on the job site and from over-handling. Wood blocking placed between bundles will help provide better circulation. Be sure to stack materials using only the manufacturer's recommendations. Over stacking could result in damage to the materials, injury, or even death if a stack were to fall on you or someone else.

After you unload the truck and noted on the manifest any items that appear to be missing, defective, or in excess you should get these load manifests to your supervisor. He will use these for each truck to compare with the master manifest provided by the building manufacturer for the entire building. If you have any damaged, missing or excess material your supervisor should call the manufacturer’s customer service center as soon as possible. In many cases missing or damaged material will cause a delay for the completion of job.

Chapter 7

The final thing we will look at for this module is staging your materials for framing. As soon as the truck is unloaded, the lifting equipment should be used to start the framing process: installing the columns and raising the assembled rafters into position.

Columns and rafters are usually staged near the position where they will be installed. Use blocking on the slab for easy pickup. End walls are usually laid out at each end of the slabs with the columns near their respective anchor bolts. You need to have an access area through the center of the building for your installation equipment, so keep that area clear of materials.

Locate your hardware packages in a place that is central to your crew to minimize walking. Purlins and girts should normally be stored near the sidewalls depending on how many bundles you have, clear of other packages or parts. Sheet packages are usually located along one or both side walls on the ground and sloped for drainage. Put flashing and trim components on a corner of the slab or near one end of the building to keep them out of the way until they are ready for installation.

Be sure to take the necessary steps to protect the job site from vandalism and theft and to keep the materials from being carelessly damaged by fellow workers, equipment, or weather.

This concludes the module on unloading, material handling, and staging. This presentation was created by the Metal Buildings Institute and is one of several training modules available to metal building erectors. We hope that it has helped you in understanding the basic procedures for unloading, material handling, and staging.