

Glass Processing Technology
Prof. Mr. Amit Raj Jain
Department of Civil Engineering
Indian Institute of Technology, Madras

Lecture – 16
Environment and Eco Packaging

So, hello everyone. I am Amit Raj Jain. I am incharge for customer service and out bound logistics for glass business. So, we will begin a presentation about what is environment, and how eco packaging helps us in terms of saving our environment.

(Refer Slide Time: 00:41)



The slide features a white background with a blue header area. On the right side of the header, there are two logos: the NPTEL logo (a circular emblem with a gear and a sun) and the Glass Academy logo (a blue shield with a white building icon and the text 'GLASS ACADEMY'). Below the logos, the title 'Trees play a very big role in Saving Our Environment' is written in a bold, blue, sans-serif font. Underneath the title, there are two square images side-by-side. The left image shows a row of green trees on a grassy field under a blue sky with light clouds. The right image shows a single tree with a green canopy and a complex, exposed root system that looks like a network of blue and green lines. At the bottom of the slide, there is a decorative horizontal line with a blue background, featuring a white silhouette of a city skyline with various buildings and icons.

All of you know that, tree plays a very big role in saving our environment. So, let us discuss first about something about the trees.

(Refer Slide Time: 00:46)

The Significance of Trees

- **Trees** contribute to the environment by providing oxygen, improving air quality, conserving water, preserving soil and supporting wildlife.
- **Trees** take in carbon dioxide and produce oxygen so that we can breathe and this is the most essential part of our life



Trees contribute to the environment by providing oxygen, improving air quality, conserving water, preserving soil and supporting the wildlife. Trees take in carbon dioxide and produce oxygen so that we can breath and this is the most essential part of life, which all of us know that.

(Refer Slide Time: 01:02)

What does a tree mean to you?



So, what does a tree mean to you or mean to all of us?

(Refer Slide Time: 01:05)

The Importance of Trees

- Wind barriers
- Filtration
- Biodiversity
- Shade
- Erosion control
- Decreases noise pollution



So, the importance of trees, it acts as a wind barrier, a filtration, biodiversity, shade, erosion control, and also decreases noise pollution.

(Refer Slide Time: 01:15)

The Living Landscape

- Rural
- Urban



The living landscapes, how does tree help in the rural and the urban landscapes.

(Refer Slide Time: 01:21)

How do you value trees in Rural Environments?



NPTEL GLASS ACADEMY

A decorative blue bar at the bottom of the slide contains white icons representing various educational and technological concepts.

So, how do you value trees in rural environments?

(Refer Slide Time: 01:25)

Benefits of Trees in the Rural Environment

- Wind protection for crops
- Erosion control
- Creates diverse plant and animal habitats
- Purifies the air absorbing carbon monoxide, sulfur dioxide and nitrogen dioxide



NPTEL GLASS ACADEMY

A decorative blue bar at the bottom of the slide contains white icons representing various educational and technological concepts.

Wind protection for crops, for erosion controls, creates diverse plant and animal habitats, purifies the air absorbing carbon monoxide, sulfur dioxide and nitrogen dioxide.

(Refer Slide Time: 01:38)

Benefits of Trees in Urban Environments



- Tree muffles urban noise.
- A mature leafy tree produces as much oxygen in a season so that 10 people inhale in a year.
- Trees help cleanse the air.
- Energy savers and windbreakers.



And how does it help in the urban environments, tree muffles urban noise. A mature leaf tree produces as much as oxygen in a season, so that 10 people can inhale in a year. Trees help cleanse the air. They serve as a energy savers and also windbreakers.

(Refer Slide Time: 01:56)



So, yes to protect the environment and to save the trees. And to do this, we also dispatch glass in naked, which is also called the unpacked condition.

(Refer Slide Time: 02:09)

Yes Naked Glass Sales & Despatch – A boon !

	Protect the Environment
	Increases the Storage density both at the plant & Customer Warehouse
	Easy handling – Faster loading & Unloading
	Reduction of handling Risk and Minimal Breakage in Transit
	Reduction in wood usage for packing and overall cost benefit



So, going forward yes naked glass sales and despatch is it a boon. Yes friends, it is a boon. So, one is it protects the environment. Second is increases storage density both at the plant and the customer warehouse. Easy handling-faster loading and unloading reduction of handling risk and minimal breakage in transit also reduction in wood usage for packing material and overall cost benefit.

(Refer Slide Time: 02:38)

Naked Glass Handling



- Explaining the safe methods of Naked Glass handling
- Unloading
- Movement to warehouse
- Storage



So, let us discuss about naked glass handling. And how do naked glass is handled at the customer hand. We will explain about the safe methods of naked glass handling, unloading, movement of warehouse, and the storage.

(Refer Slide Time: 02:52)

SEQUENCE OF OPERATIONS

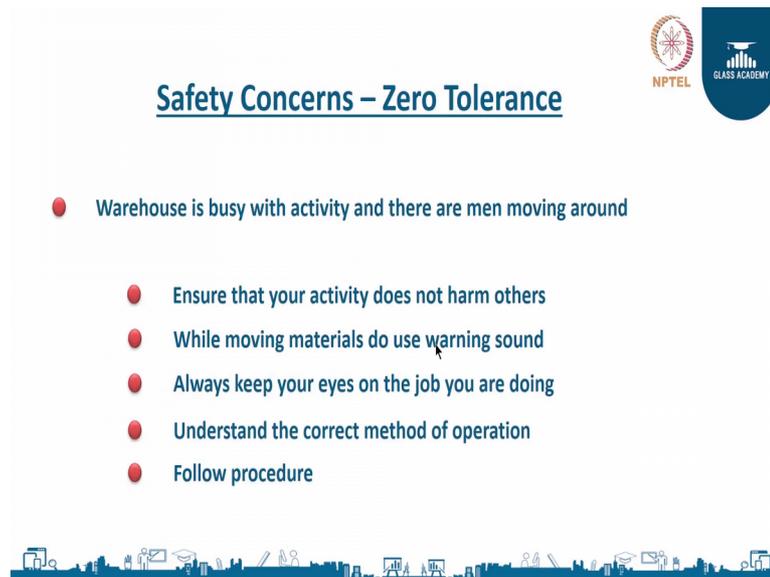
General Responsibilities

- Ensure availability of trained manpower
- Ensure wearing of PPE by all personnel responsible for handling Naked Glass
- Helmet, Safety Shoes, Gloves & Googles
- Arm Guard / Leg Guard / Apron



So, there is a sequence of operations. First the general responsibilities while handling naked glass. Ensure availability of trained manpower, which is very very very important. We should have the skilled and the trained manpowers. Ensure wearing of PPE by all the personnel responsible for handling naked glass. Helmet, safety, shoes, goggles, and gloves, which are most important factors to be taken care while handling naked glass arm guard, leg guard, and the apron, you can see the picture below with all the items given there.

(Refer Slide Time: 03:28)

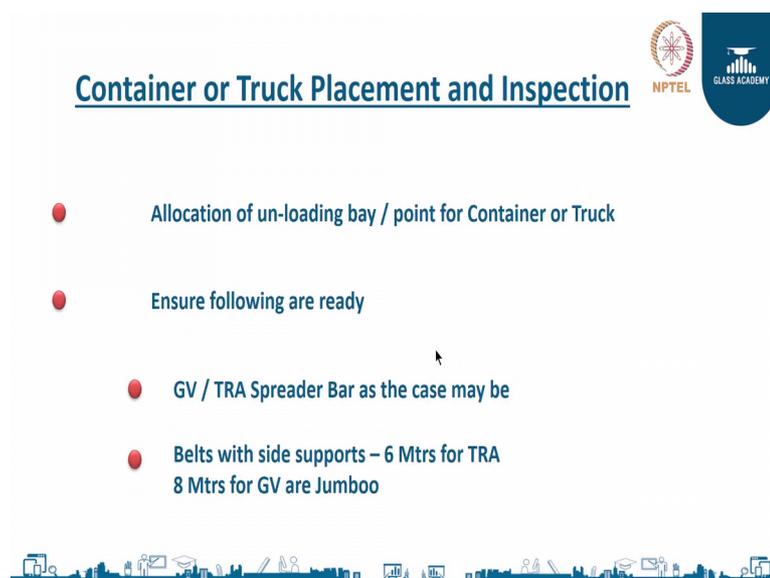


Safety Concerns – Zero Tolerance

- Warehouse is busy with activity and there are men moving around
 - Ensure that your activity does not harm others
 - While moving materials do use warning sound
 - Always keep your eyes on the job you are doing
 - Understand the correct method of operation
 - Follow procedure

Safety concerns, we should have zero tolerance. All of us know that warehouse is a busy activity and there are men moving around. Ensure that your activity does not harm others while moving material do use warning sound. Always keep your eyes on the job you are doing. Understand the correct method of operation. And follow the procedure, which is being defined.

(Refer Slide Time: 03:50)



Container or Truck Placement and Inspection

- Allocation of un-loading bay / point for Container or Truck
- Ensure following are ready
 - GV / TRA Spreader Bar as the case may be
 - Belts with side supports – 6 Mtrs for TRA
8 Mtrs for GV are Jumboo

Be prepared for the container or the truck placement and the quality inspection. Please allocate un-loading bay, and a point for truck or a container. Ensure the following are

ready. The GV, TRA spreader bar as the case may be depending upon the size of the glass belts with side supports- 6 meters for TRA, and 8 meters for the GV are jumbo sizes.

(Refer Slide Time: 04:14)

Different types of unloading

- Using Crane
 - Relevant Spreader Bar
 - Belts with bottom wood support
- Manual
 - Trained people



There are different types of loading. One is the manual, which is done on also crane. Now a days most of the places, they adopt the crane method of unloading. For the crane method of unloading, we require relevant spreader bar, belts with bottom wood support, which is most important factor.

(Refer Slide Time: 04:32)

Spreader Bar with Nylon Belts



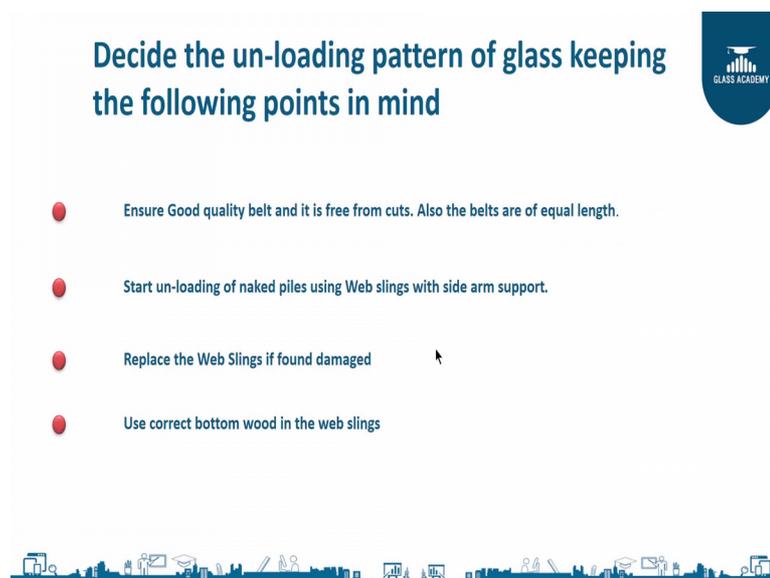
This is the spreader bar with nylon belts, you can see in the picture. You have this spreader bar is the metal equipment, and the belts, which are with of nylon.

(Refer Slide Time: 04:43)



This is the truck loaded with naked glass. You can see the TRA spreader bar with 6 meter belt. And the belt side supports, where side arm support is also given ok.

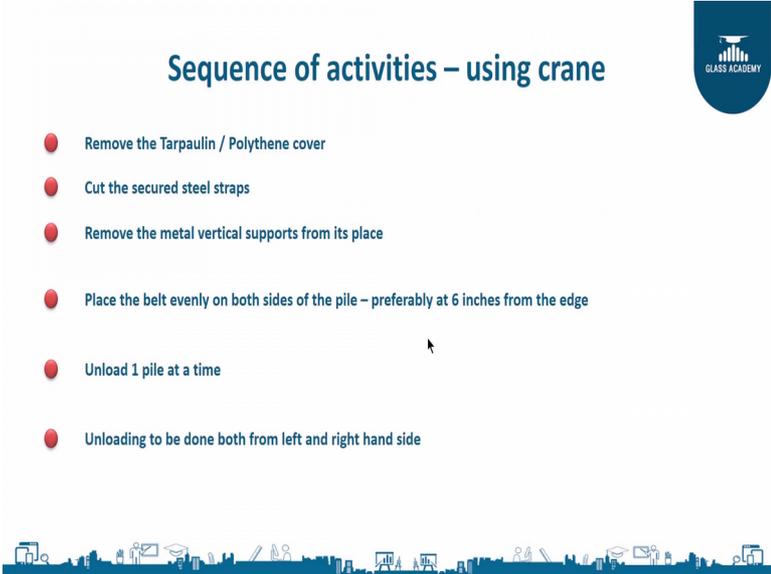
(Refer Slide Time: 04:53)



Decide the un-loading pattern of glass keeping the following points in mind. Ensure good quality belt and ensure that it is free from any cuts. And also both the belts are of equal length. Start un-loading of naked piles using the web slings with side arm support,

which is very very important. Replace the web slings, if it is found damaged. Use correct bottom wood in the web slings, which is important the glass should not get tilted while unloading.

(Refer Slide Time: 05:24)



The slide features a title 'Sequence of activities – using crane' in a dark blue font. To the right is the Glass Academy logo, which consists of a blue shield with a white building icon and the text 'GLASS ACADEMY'. Below the title is a list of six steps, each preceded by a red circular bullet point. At the bottom of the slide is a decorative horizontal bar with a white silhouette of a city skyline.

Sequence of activities – using crane

- Remove the Tarpaulin / Polythene cover
- Cut the secured steel straps
- Remove the metal vertical supports from its place
- Place the belt evenly on both sides of the pile – preferably at 6 inches from the edge
- Unload 1 pile at a time
- Unloading to be done both from left and right hand side

Sequence of activities-using the crane. First remove the tarpaulin or the polythene cover, which is covered the truck. Cut the secured steel straps, very safely. Remove the metal vertical support from its place. Place the belt evenly on the both the sides of the pile- preferably at 6 inch from the edge. Unload only 1 pile at a time. unloading to be done both from left and the right hand that is very very important.

(Refer Slide Time: 05:57)

Bottom wood dimension..

- Ensure that the correct size bottom wood is used for lifting the Naked Pile.
- **Bottom wood size = Pile width + 10mm**

Excess width Less than pile width

NPTEL GLASS ACADEMY

Again bottom wood dimension should be accurate and proper. You can see the picture here; ensure that the correct size bottom wood is used for lifting the naked pile. The bottom wood size should be pile width plus 10 mm, which is important to balance the glass, while unloading. Excess width or less width can create damage to the glass. And the glass they chance of glass falling down.

(Refer Slide Time: 06:23)

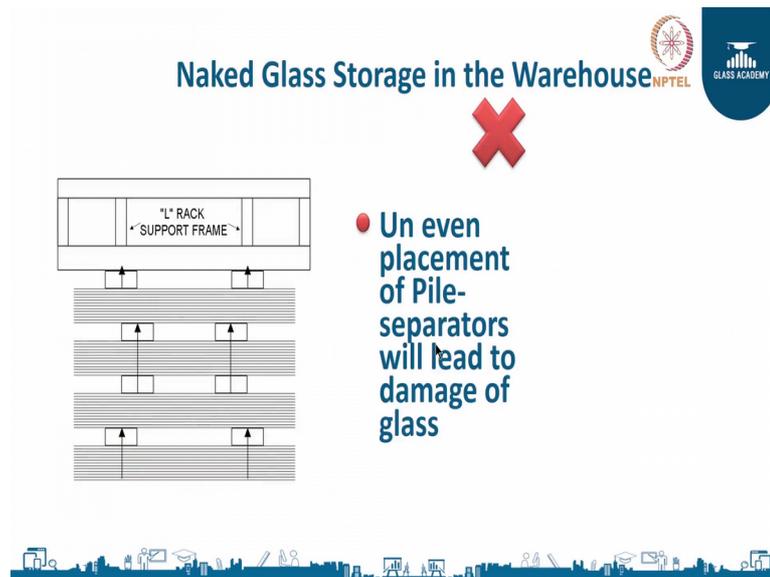
Storage Rack

- Rack with rubber lined legs empty and ready for stacking the unloaded piles.
- Rack and legs are free from any cullet pieces
- 40Density thermocol / Foam support over metal rack

NPTEL GLASS ACADEMY

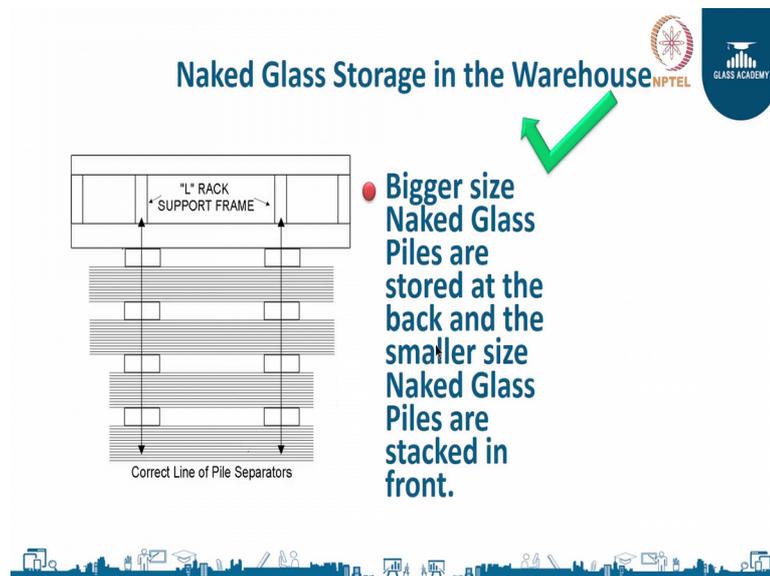
The storage rake rack should be rubber lined legs should be empty and should be kept ready for unloading naked piles.

(Refer Slide Time: 06:30)



Way of keeping the pile separator and to store the naked glass.

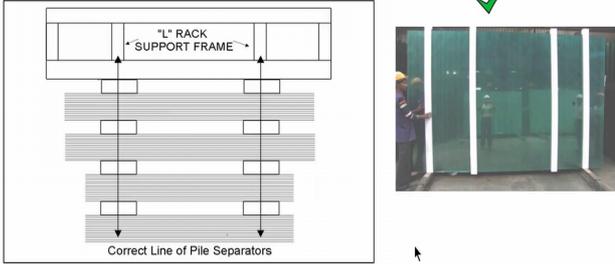
(Refer Slide Time: 06:35)



From this picture you can see that different types of glasses in the back you have the bigger sizes, in the front you have the smaller sizes. But, you can see that they are stored evenly, they are stored one behind the other with the proper pile separator, which is being given.

(Refer Slide Time: 06:51)

Pile separators & its position...



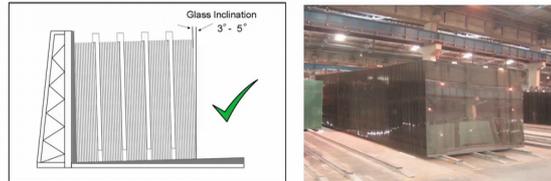
The diagram shows a cross-section of a glass stack supported by an "L" RACK SUPPORT FRAME. It illustrates the correct placement of pile separators between the glass panes, with arrows indicating the "Correct Line of Pile Separators". A photograph to the right shows a real-world application of this setup, with a green checkmark above it.

- Multi ref., stacking :
 - Bigger size at back & smaller size in front
- Length of pile separator :
 - Single, Uniform thickness to cover full height of pile

Pile separator and its position. This is how the glass is being stored and the pile separators are kept. You can see the picture, which clearly defines, how the pile separator has to be kept in the over the pile.

(Refer Slide Time: 07:04)

Angle of stacking...



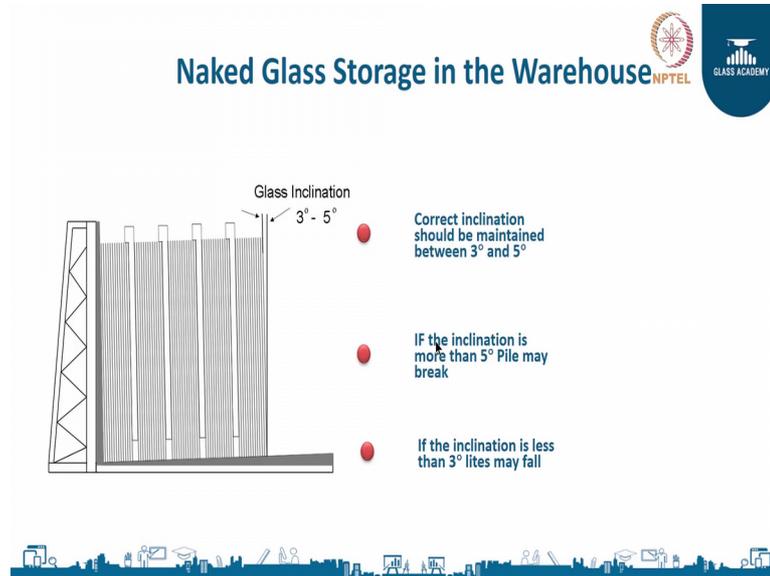
The diagram shows a side view of a glass stack with a "Glass Inclination" of 3°-5°. A green checkmark is placed next to the diagram. A photograph to the right shows a real-world application of this setup.

- Correct inclination should be maintained between 3° and 5°
- If the inclination is more than 5° pile may break
- If the inclination is less than 3° pile may fall

The angle of stacking, this is very very important factor. Correct inclination should be maintained between 3 degree and 5 degree. If the inclination is more than 5 pile may break. And if the inclination is less than 3 pile may fall we can see the picture, how the

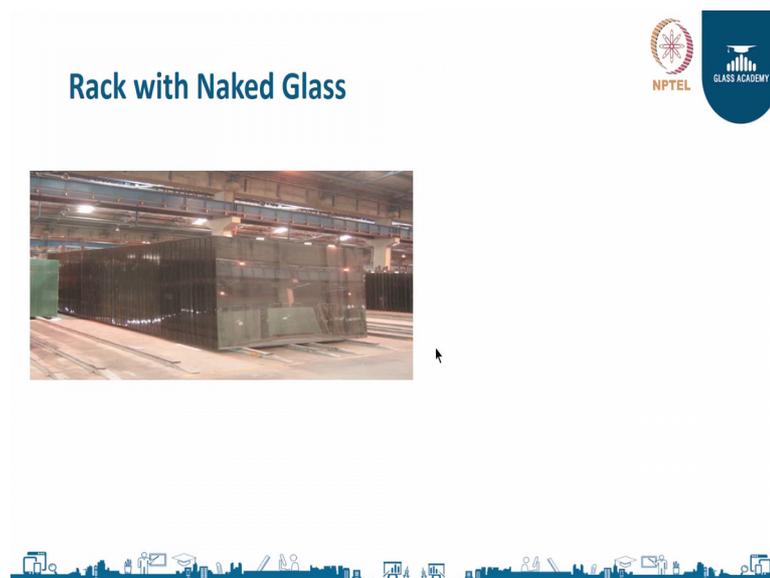
glass is kept in the warehouse. It is inclined in a proper position to avoid any fall and breakage of glass.

(Refer Slide Time: 07:30)



This is the naked glass storage in warehouse. We can see the picture again, which is clearly showing that how the naked glass is being stored on the racks one behind the other.

(Refer Slide Time: 07:41)



This is the complete rack, which gives the proper picture and understanding how the glass is being stored in the warehouse.

(Refer Slide Time: 07:49)

Don'ts - (Naked Glass Handling)



- Do not place bigger size Glass pile in front of smaller size glass pile.
- Do not place pile separators unevenly
- Do not stand in front of the stored and or moving naked piles
- Do not incline the piles more than the required 3° - 5°



So, what are the do not's and the dos while handling naked glass. Do not place bigger sizes glass pile in front of smaller glass size pile, this is the very very important thing. Do not place pile separators unevenly, as discussed before this should be placed one behind the other. Do not stand in front of the stored and or moving naked piles, safety is very very important. Do not incline the piles more than the required degree 3 to 5 degree. It should be maintained either there are changes of pile falling down or the pile breaking up.

(Refer Slide Time: 08:26)

Do's - (Naked Glass Handling)



- Do ensure that the bottom wood is of the correct size (Pile width + 10 MM)
- Do use Nylon slings of same size
- Do place full length pile separators between each pile



The do's. Do ensure that the bottom wood is of correct size. Do use nylon slings of the same size, which is very very important. Otherwise, it will misbalance the glass while unloading. Do place full length pile separators between each piles.

(Refer Slide Time: 08:45)

Summary - (Naked Glass Handling)

- TRA Naked glass movement – the name of the activity itself clearly indicates the hazards and the care required.
- Being individual lites the risk of lites falling and breaking is very high while stored or being transported.
- Being unprotected the damage to the material is also high while being moved
- Due care and strict adherence to procedure is required.

The slide features the NPTEL logo and the Glass Academy logo in the top right corner. At the bottom, there is a decorative horizontal bar with a silhouette of a city skyline and various educational icons.

So, summary, TRA naked glass movement-the name of the activity itself clearly indicates the hazards and the care required, and to be taken by the people who are handling naked glass in the warehouse. Being individual lites the risk of lites falling and breaking is very high while stored or being transported. Being unprotected the damage to the material is also high by moved. So, due care and strict adherence to the procedure discussed as of now is required, this is very important. And we need to ensure that there should be zero tolerance in terms of safety, in terms of the procedure, which is being clearly defined.

(Refer Slide Time: 09:29)



So, there are different types of we load naked glass in difference types of sizes. And there are different types of naked glass loading. One is only the TRA sizes, the TRA sizes are the bigger sizes, and which are of even sizes of same sizes in attract, very easy to load. These are all small sizes. Small sizes are in a different segment of customers, it is required where they customers unload sheet by sheet and in case of TRA, it is also unloaded manually or also with the help of crane.

This is a mixed combination of TRA plus SSS sizes, which is more of a different combination. And it is very difficult to load, but easy in terms of unloading. This is multi references. Multi references in the sense, we can load any number of given sizes with TRA, SSS with different reference combination, which is also possible.

Single references in a U frame. U frame is a different kind of a frame where in also. So, we have different sets of frame for different sizes to be load in all. Even the GV sizes, which are a biggest and to be unloaded mostly by using crane if you see, that we can load all types of sizes and unload all types of sizes in naked. This is possible and with this, we can save lot of trees. And finally save a environment, which is required at this (Refer Time: 10:56).

(Refer Slide Time: 10:55)



So, this is the unloading of material from the truck at the customer end. You can see the sequence of process, and how safely it is being unloaded with all the procedures have being properly followed. This is important, and we need to ensure the proper unloading of glass at the customer end also.

(Refer Slide Time: 11:15)



So, over a period of years there is been a process, and this is being defined, and followed and saving of trees and success of eco packaging has been very consistent. And we have

been growing in terms of saving a trees and also the success of eco packaging. So, with these friends, I end my presentation.

(Refer Slide Time: 11:36)



So, let us all of us go green. And save trees, this will finally save you.

(Refer Slide Time: 11:42)

