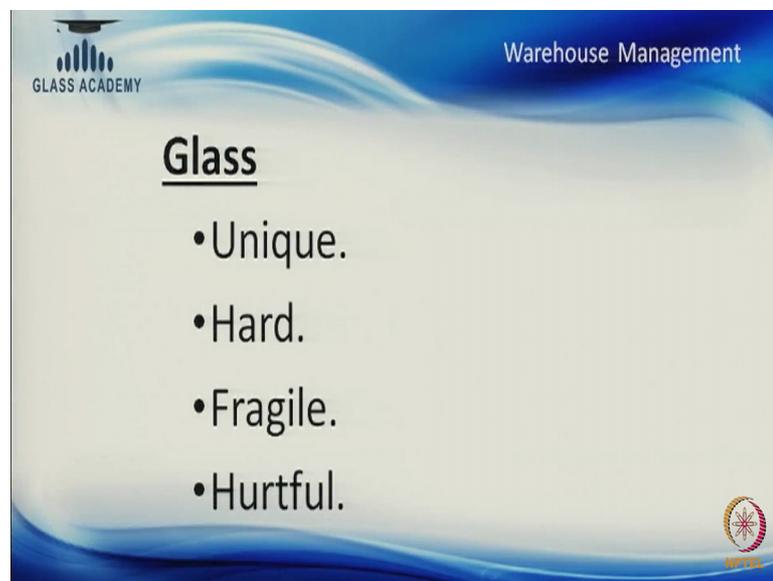


Glass Processing Technology
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Indian Institute of Technology, Madras

Lecture – 17
Glass Warehouse Management

Friends, today we will be talking about Warehouse Management of a Glass industry; my name is Carnal Shailesh Pathak I am from art and glass.

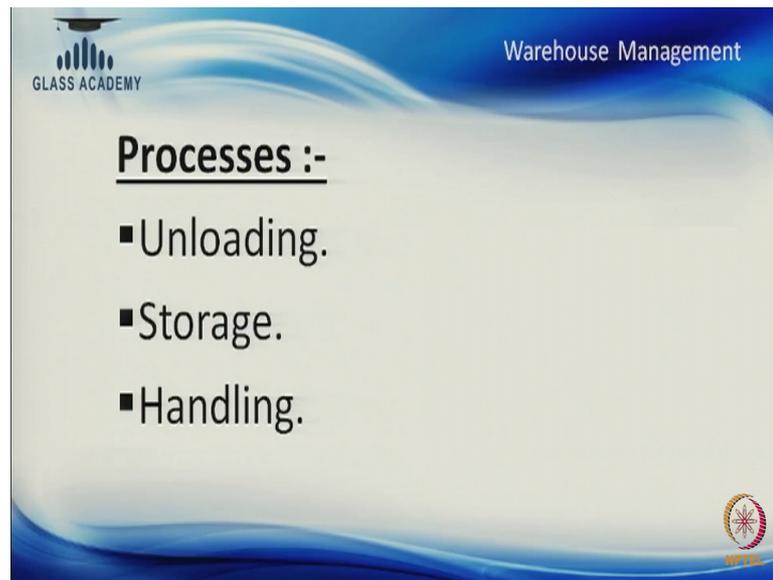
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You all know glass is a very unique product, it cannot be compared with anything else wherever we have to use glass, we cannot use wood, we cannot use anything it is a unique product, it is a one of the very old material. From a prehistoric days this glass was found near a molten lava; so molten lava was when it cooled down it most of the pieces it became a solidified in a shape of a glass.

So, it is a very old product everyday glass technology is changing. So, as far as building material is concerned it is a very new product, very fast developing, very fast changing product. It has a unique characteristic it is hard, but it is brittle; it is very strong yet it is fragile, it is so pleasing to eye, but it is very hurtful to the body. So, it has to be handled in a different way it is handled carefully.

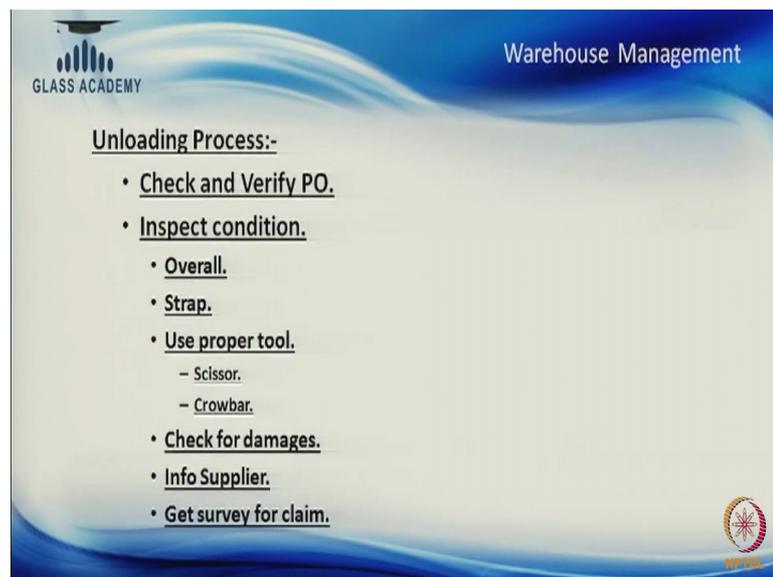
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The slide is titled "Warehouse Management" in the top right corner. In the top left corner, there is a logo for "GLASS ACADEMY" featuring a graduation cap above a bar chart. The main content is titled "Processes :-" and lists three items: "Unloading.", "Storage.", and "Handling." in a bulleted format. In the bottom right corner, there is a circular logo with a star and the text "NPTEL".

You cannot take glass lightly otherwise our team will get hurt. So, today I will be talking about warehouse management or a handling of a glass under three heads. One is unloading, second storage and third handling the glass; I will also talk about what all gears or a clothing one should be using while handling the glass and other dos and don'ts or a precautions while handling the glass.

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The slide is titled "Warehouse Management" in the top right corner. In the top left corner, there is a logo for "GLASS ACADEMY" featuring a graduation cap above a bar chart. The main content is titled "Unloading Process:-" and lists several steps: "Check and Verify PO.", "Inspect condition.", "Overall.", "Strap.", "Use proper tool." (with sub-points "Scissor." and "Crowbar."), "Check for damages.", "Info Supplier.", and "Get survey for claim." in a bulleted format. In the bottom right corner, there is a circular logo with a star and the text "NPTEL".

When a glass loaded vehicle enter our premises before we open that thing or before we start unloading, we must check what we have ordered for? What we have received and what is loaded on the vehicle?

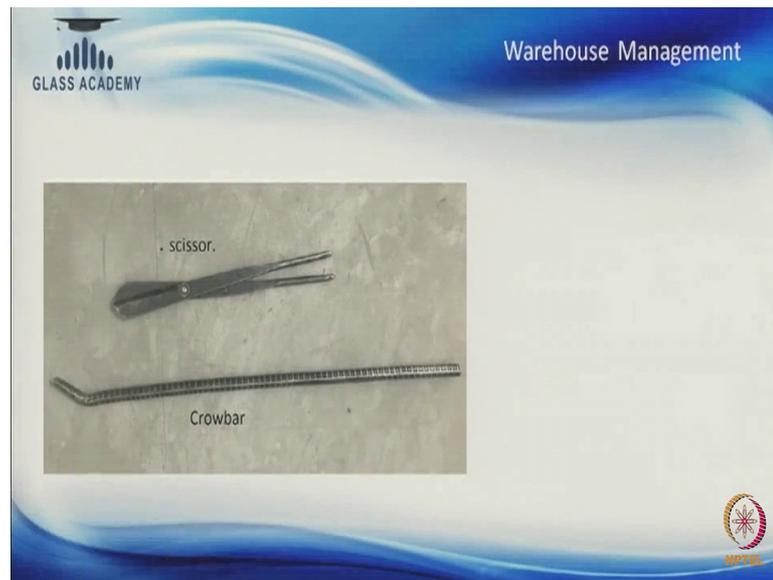
If there is a any discrepancy; if we have demanded something else and we received something else, before opening, before unloading you must get back to your supplier must get to get back to your vendors or a manufacturer. So, that we do not handle or a shift glass again and again load or unload; next is inspect condition, before opening or before unloading a crate we must inspect that it has been tied properly, it has lashed properly and all the crate or a open crate they are without any damage and we can safely take the delivery.

So, first inspect the vehicle from all side so that the vehicle is not leaning to a one side because of the uneven distribution of the glass especially after traveling, after taking on lot of jerks and moment of the road sometime lashes become loose, sometime glass center of gravity shifts so, that it becomes dangerous to unload in normal fashion. So, we must inspect the vehicle overall and then how the glass is loaded or tied into that vehicle. We must check straps has it been strapped properly or because of some jerk some strap has loosened or a broken; all those things has to be ensured before opening this thing.

We must use proper tool to cut some of the straps, to open some of the straps loosen some of the straps. And if we are using a wooden crate then crowbar to remove the nails and scissor metal scissor in Hindi; it is called [FL] for cutting the metallic strap. When we have opened a crate then again we must inspect whether all the sheets are intact or damaged.

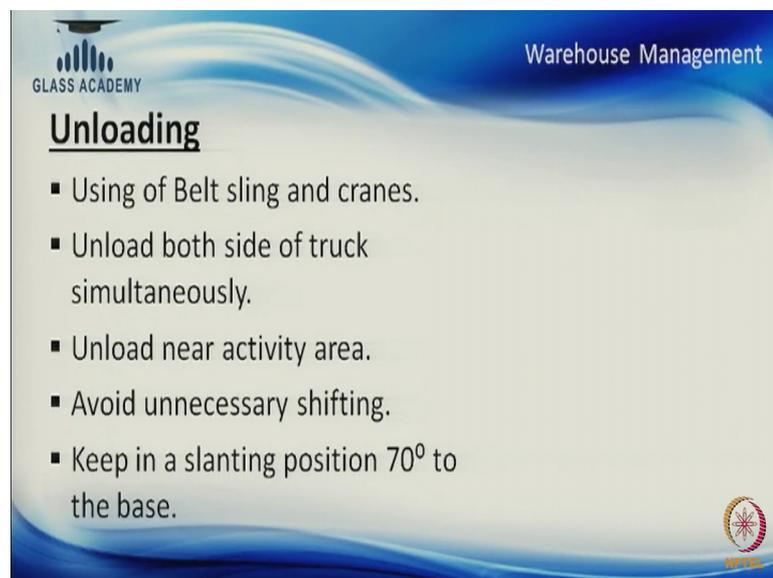
If something has been damaged in transit; we must inform the supplier because when we inform the supplier then somebody will come; a surveyor will come to inspect and whatever have been damaged because of the is it covered with transit insurance; so, we can only claim when it is inspected by particular authority.

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Here is a image of a [FL] or a scissor metallic scissor and a crowbar.

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Glass unloading use belt sling and cranes; sometime we feel that with four people we can easily lift a glass or a crate or something, but because of a uneven of the ground, uneven ground or certain other reasons you really do not know where the impact of glass goes and we get a damage glass.

So, before we remove a pallet or a crate from the vehicle; we must tide a sling belt we must use crane I will show you a image.

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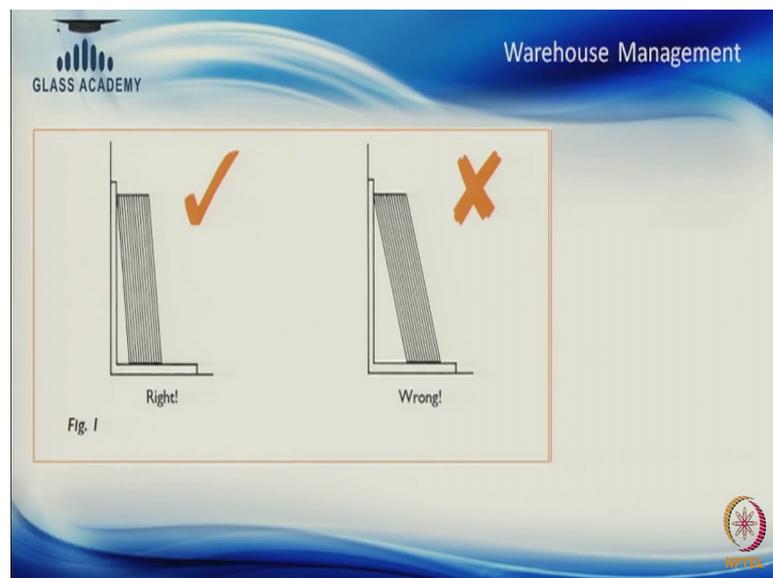
So, this is a image of a crane which lifts the pallets; when we use these sling belts or crane we must take care of the weight classification. Every crane has a limited weight classification; at certain stage location the hook can lift 2 tons and if the arm is a extended; then the 2 toned hook cannot lift even half. So, we must understand what is the load, what is the capacity of the crane or a hydra and the driver also should know what is the proper usage from where one has to load that hook.

Similarly, those sling belts they also have a weight classification; if 2000 kg weight classified sling if you use it on a much heavier this is a chance of it is getting break. So, when you are using belt sling; kindly check the weight classification, crane classification then we must proceed ahead. What happens when we are unloading sometime we start unloading from one side on a; a rack or any other rack the vehicle loading is done such a fashion that load is equally distributed.

So, similarly while unloading also we have to be unload from a both the sides. So, that it does not lean on one side, it can sometime be very risky; if you have a only unloaded from one side unload near activity area. Planning is a very important just because one has to unload a vehicle at a very short notice; that does not mean you will unload at any given place. We must analyze and plan that where this glass will be used; if it is a recently been used or being used then we must take it to a cutting area or a storage area where we want to keep it for long.

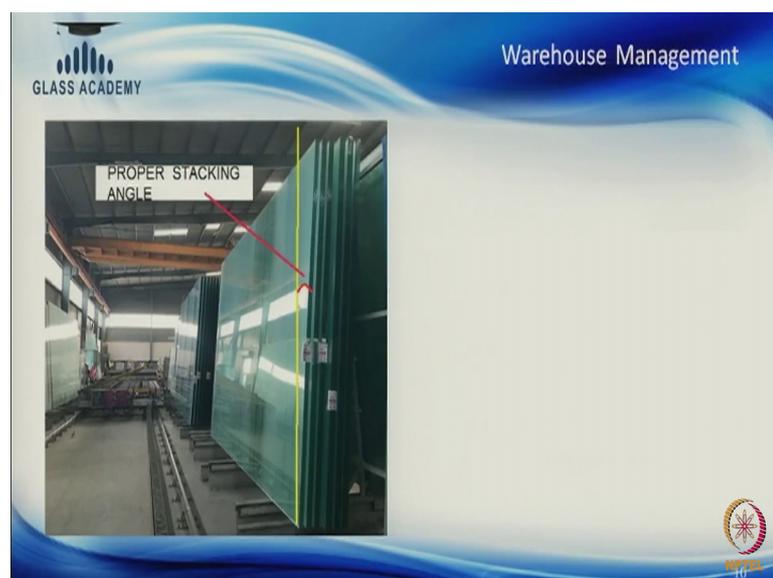
Otherwise, we will be wasting efforts manpower and time avoid unnecessarily shifting. Glass is a heavy and fragile material if we have to shift few times; you will definitely get hurt or we will damage some glasses which will result in injury and loss of funds. Keep in slanting portion 70 degree to the base this image I will show you another image.

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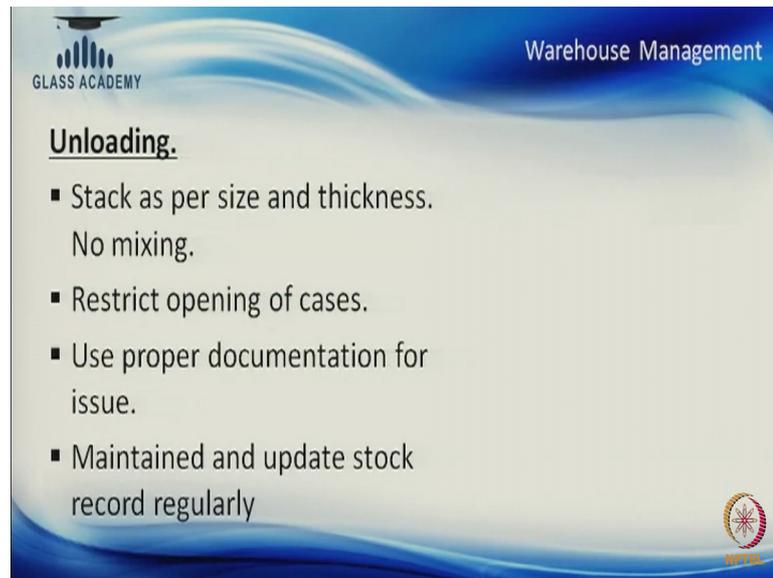
If that angle on which it is tag is more than specified; their chances of either glass falling on other side or excess load on the wall or somewhere else on a flooring.

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This angle I was talking about the stacking angle from the base or bottom; it can be 70 degree. So, if in a normal room condition when sheets are inclined at this angle they will not fall down, but if angle is acute or obtuse with the slight wind also; there are chances that sheets may fall.

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The slide is titled "Warehouse Management" in the top right corner. In the top left corner, there is a logo for "GLASS ACADEMY" featuring a stylized building icon. The main content is under the heading "Unloading." and consists of four bullet points: "Stack as per size and thickness. No mixing.", "Restrict opening of cases.", "Use proper documentation for issue.", and "Maintained and update stock record regularly". In the bottom right corner, there is a small circular logo with a star-like pattern and the letters "MPTEL" below it.

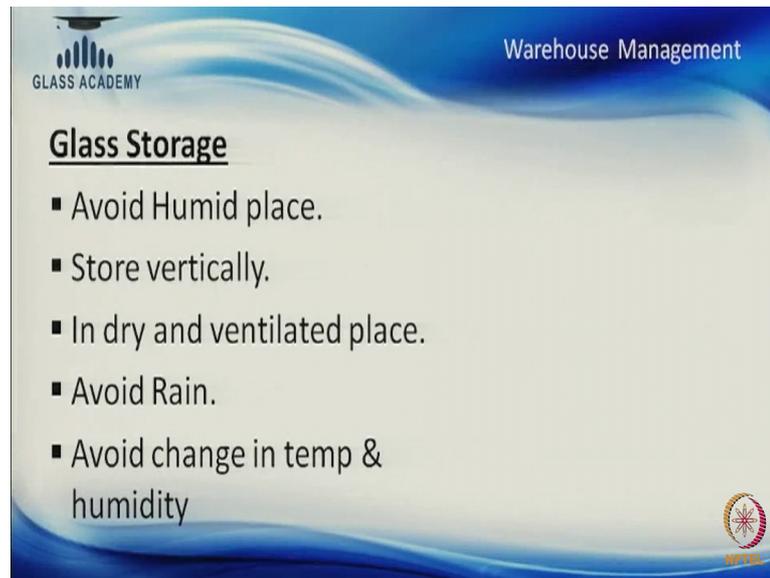
While stacking we must stack as per size; there is no point stacking with the random size because then we will not be able to account for, if a smaller sheet is kept behind a larger sheet and there are chances of undue pressure on that bigger sheet and small sheet.

So, breakage and damage will result; restrict opening of cases. If we have one crate open, let us finish that first otherwise just for a ease of this thing; if you open too much then accountability will be problem and wastage will increase. The low e glass or always comes with the airtight packing and they have to be insulated, laminated in a certain period of time. In low e glasses it becomes very important not to open cases unless the previous case have been processed.

This will result in a wastage of glass and coating will go bad on a oxidation; use proper documentation for issue and accounting procedures. Whenever a crate is opened we must take stock of situations and add that stock in our inventory. And we should not be issuing without an issue receipt or a proper documentation. Otherwise accountability will not be there and company will not come to know if you have wasted material or lost a material stock is money; money should be kept properly.

Similarly, glass as well; so, please maintain and update regularly the stock if you have issued few sheets; we should not be callous that we will we will when we will issue the balance at that time I will account. No we must issue or we must maintain account each and every sheet whenever we issue as in when it occurs.

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Now, we will talk about glass storage; avoid humid places, whenever we receive a glass it is it comes along with the kind of a powder between two sheets. The purpose of that powder is that it should the glass should not get scratched because of the rubbing with each other.

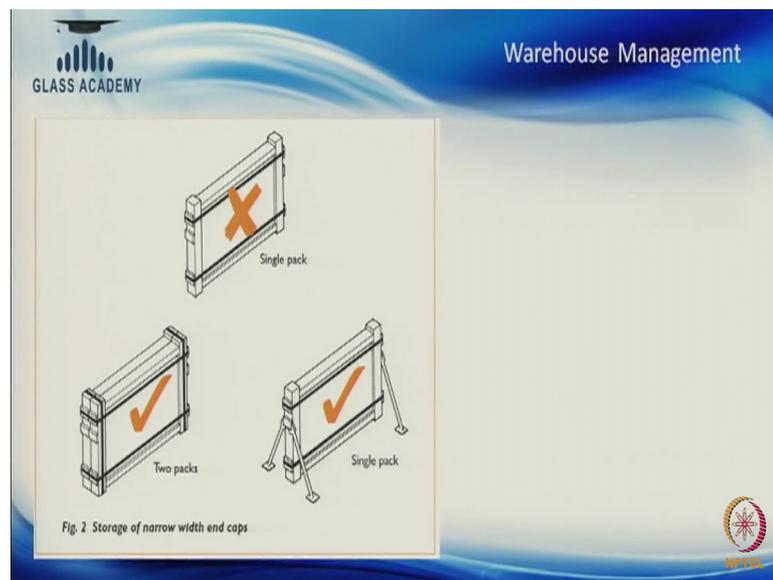
So, if we stock it in a humid place or a place where we have a lot of a water running water or dripping water that glass will get damaged or that glass will not be proper glass, it will be very difficult to clean that glass and it will result in lot of rejection of the material from the side. Store vertically; if we store glass in a horizontal positions then there are chances of it is getting damaged or getting scratched because of the rubbing of two sheets in a stack.

So, we must stack it vertically we must cover it and as I see it before the angle of inclination should be as per size of the sheet and stock. Glass should be stored in a dry and well ventilated place; if there is a humidity then low e glass or any other glass for that matter will get damaged or will get bad, it will not be able to perform or it will not look nice. So, the your storage should be dry and well ventilated. Avoid change in

temperature and humidity; sudden change in temperature and humidity will put undue pressure on a environment or ambience of the storage house and it will result as I said before two sheets over there it is a powder which comes in between the two sheets of glass.

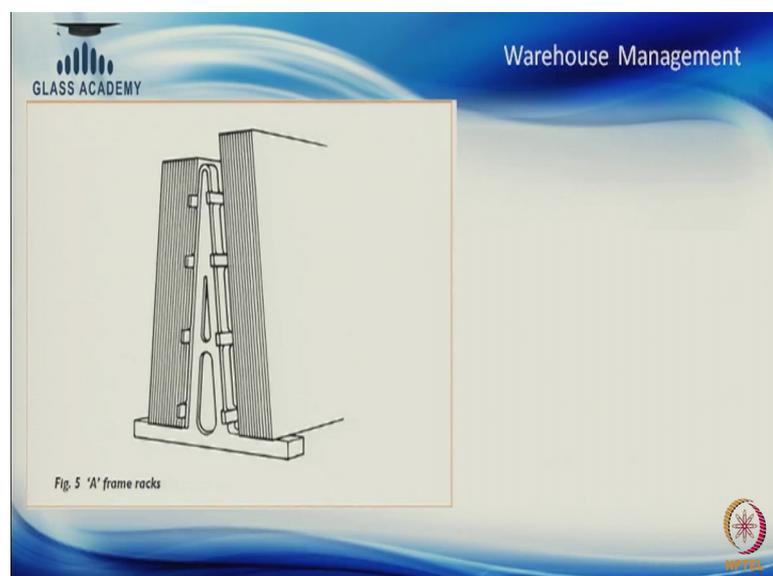
So, because of humidity and temperature that will put a mark or leave a impression on the glass.

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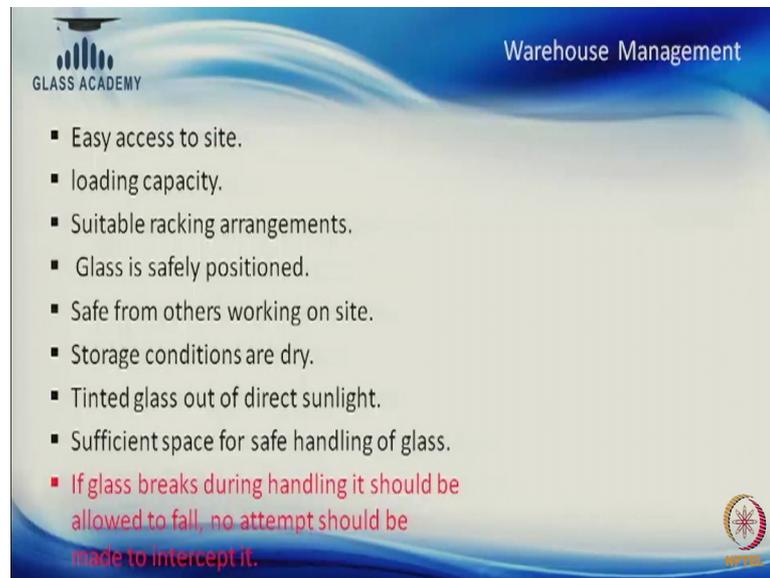
Here is a image of a stacking of single or a double stack just for information sake.

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This image on your view file is called A rack.

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So, your storing location should be should have a easy access to the site. It means if you are using a vehicle inside your warehouse that is has should have a sufficient space for turning a vehicle or bringing the vehicle in and going back or loading capacity is dependent on our site.

So, if we are loading a large sized sheet on an truck; then our space should be designed in such a fashion. Wherever we are storing the glass it should have a proper stocking or a racking arrangements; sometime commonly we seen industry that it is stacked along the wall and it has resulted in a lot of accidents. Because if those walls are not designed for that kind of a load, then they way they may give away and you have a damaged glasses and a cause of accident.

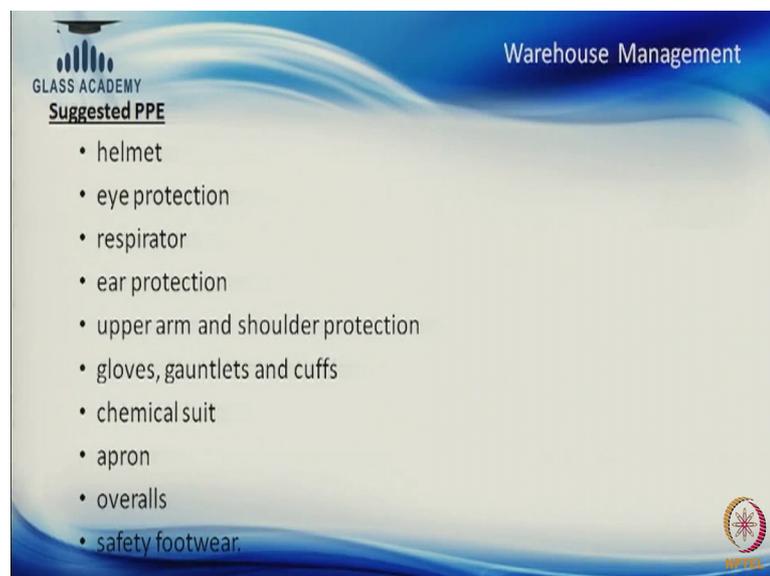
Glass should be placed at a safe angle; why we are repeating again and again for stocking for unloading. This angle if it is not proper it will not only scratch the glass, it will not only damage the glass, it will not only break the glass, but it can also result into accidents. So, gentlemen please be careful keep the angle proper; your storage site should be safe from others working of site, when you are storing somebody may be taking out glasses, somebody may be shifting.

So, it should be safe they should be sufficient and there should be some procedure when somebody is working in one vicinity; others should not be working otherwise it will result into accident or hurt. Storage conditions are dry; we are reminding again and again that your condition should be dry for a good quality glass. Tinted glass or coated glass out of direct sunlight; as we said the coated glass comes in a airtight packing. So, it should not be exposed to direct sunlight.

Similarly, coating or tinted glass also has some characteristic which can get affected by strong sunlight. In your warehouse there should be sufficient space for safe handling of glass; it is a self explanatory if you have, if you are handling a large sheet. So, there should be sufficient place to turn around to place it, to lift it from the rack. And if you can use mechanical means of handling the glass then it should be as per the machine specifications. Next very important is if because of while loading or a unloading at any stage if the stack starts falling; please do not try to hold it or do not try to because glass is such a heavy and strong material, no one can stop it of falling rack.

So, please leave it clearly, we can we can break the glass back, but any damage to human or equipment is very difficult to replace.

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So, right now on view file I have listed some protective equipment or a clothing for a person who are handling the glass; helmet, eye protection, respirator, ear protection, upper arm and shoulder protection. I must highlight this upper arm and shoulder

protection. Whenever we are cutting a glass and breaking the glass; small glass shards are always there and a small pieces of glass while handling, they gets broken and common hurt is our wrist, place where we get hurt our wrist I have seen many accident where wrist have been damaged and a stopping blood is very difficult.

So, the tool which is arm protection or a shoulder protection is very good for saving lives and saving blood. Gloves, gauntlets and cuffs; in glass industry we have many type of gloves we use lint free gloves for just cleaning purpose or when we are operating in a clean area. Sometime in some factory I have used people putting on this lint free cloth and handling glass; I am sure they know, but if they are not being supervised they will put any glass, any gloves saying I have done that PPE know. There are various type of gloves some have a rubber lining, some have a NTTA protection or NT this thing.

So, proper PPE should be used for a proper application; if we are using a raw glass. So, our gloves should be specially for that particular purpose; apron overall safety footwear. I want to highlight safety footwear; safety footwear common safety footwear has a two protection, one is toe protection and other is bottom plate protection. So, when we are handling a sheet there are chances of toes or fingers getting damaged.

So, first and foremost your safety shoes have a steel toe protection; if somebody is working on a broken glass or he is responsible for the cleaning of glass, wherever he is working these broken glass spread all around; then his shoe should also have the base plate, steel plate protection. So, that some glass shards from the sole should not damage his feet

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Summary:

By the end of this video, you have learnt about the:

- Unloading process
- Glass storage
- Suggested PPE

