Glass Processing Technology
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Lecture - 10
Safety in Glass Handling

A very good morning and we are going to talk on an important subject today it is on Safety in a Glass Handling.

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So, let me open the topic with the background. In the picture what you can see is there is a breakage of glass when it is stored and actually there is a two angle of this problem. One is that at the time of breakage the kind of hazard, the potential hazard, it possess and after the breakage you can see you know spilled collects over that place making a big hazardous condition or situation in which people can slip, trip and fall and that make an injury.

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If you really see the glass handling, then there are four ways and means of it is handled one basically people, they handle the glass manually and there is a methodology of handling it mechanically by using lot of mechanical equipments and another way of common handling of glass is lifting and moving of big glasses using EOT cranes.

Another material handling equipment, a common material handling equipment like forklift truck is used for glass in bundles. So, this is the ways in which different ways in which glass is handled.

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And when we go about you know loading and unloading of glass for transportation. In fact, it has to be loaded into the truck and this is also turn out to be a hazardous operation where in which the glass packed in crates can fall on to a person and the person is inside a kind of a confined space in the truck and in containers also its again a confined space, where you load the glass or unload it also from what it is coming from the container, this also possess a lot of hazardous situation in the operations.

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Now, coming to transportation of glass, the packed glass on roads using truck, this is also hazardous operation where in which you know the condition of our roads and the truck can topple and the people go near to it to retrieve or is at the time of toppling or else the accident happens at that point of time, it can hurt anybody. So, these are all some important topics, where in which the safety of handling glass coming into picture.

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Now, this picture shows what you can see is a kind of an injury, a cut injury basically when the human body part basically hands, legs. So, whatever it may be getting exposed to the sharp edges of glass, the cut injury caused by glass is actually very dangerous. It can go deep. Cut is also based on the weight and the size of the glass.

So, basically the consequence of a kind of an unsafe condition act and an accident is most prominently will result into a kind of cut injuries to human beings, which is a great concern in this field and that is why the importance or the prominence of glass handling with care and safety is the topic coming and it takes lot of relevance.

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Now, I am going to talk about the glass handling assets has got different domains. One is the storage part. Basically after the production of glass, it needs to be stored at some place, then you need to handle while storing and to move in between the stores from one place to another place and then, comes safety in loading and unloading because for the dispatches.

It has to be loaded into trucks, then safety in transportation, while you transport the glass what kind of precautions you need to take care and other two topics which are complementary to these domains of glass handling; one is it is a very bigger topic risk assessment, but specific to glass handling. What is the relevance of risk assessment we need to talk and then, personal protective equipment, ok.

In order to protect a person from injury, you need to basically based on the hierarchy of controls, you need to talk about elimination substitution and lot of engineering controls and then, training administrative control, but in glass handling what is very important is to select and make the people to where a minimum or else what is mandated, what is adequate personal protective equipments. At the worst case as the last option of defense, it should protect or else mitigate, reduce the you know the level of injury or the consequences or the gravity of the injury for the people who are handling the glass.

Now, let us talk about the first, the safety in glass storage.

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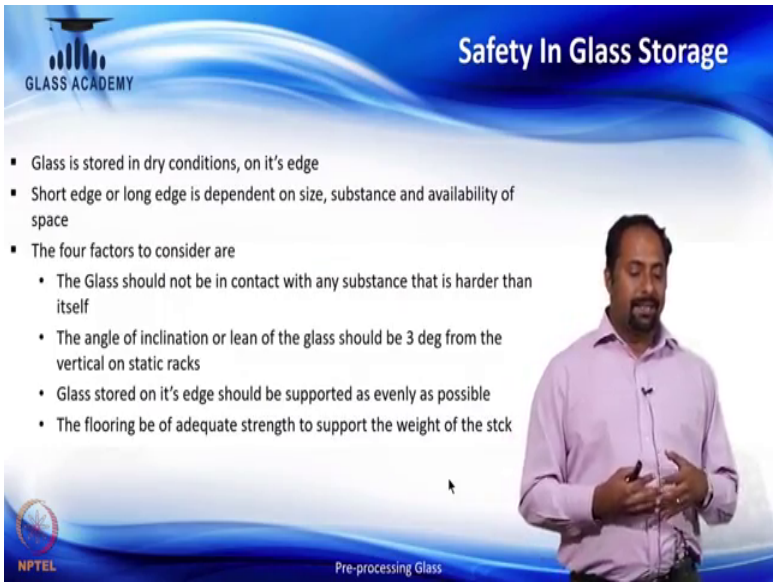

Generally wherever you go to a glass manufacturing industry or in say processing industry, you will see, you will get to see a place where you know glass is stored. So, basically glass has to be stored in dry condition on its edge. This is the common practice and short edge or long edge is depending on size substance and availability of the space.

So, you can see big warehouses, where you have ample amount of space to storage safe and there are a small place where you know space is a constrained and they are basically because of the space constrained, lot of hazard, half hazard storage conditions coming into place and 4 factors what we need to consider are; the glass should not be in contact with any substance that is harder than itself that creates, you know it actually augment the breakage of glass and the angle of inclination or lean of the glass should be 3 degree from the vertical.

On static racks, it should, the minimum is 3. You know it can be 3 to 5 like that big part, we call it as and glass stored on its edge should be supported as evenly as possible. If uneven surface is there, then that also you know creates an unsafe situation. The flooring of should be of adequate strength to stop, support the weight of the stack. So, these are what the 4 factors which needs to be considered.

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Now, here you can really see what it is right angle of storage and what is the wrong angle of storage. You can really predict that you know there is all chances that you know it can slip slide and then, create a kind of an unsafe condition.

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Now, what are the different types of storages? What is available as a common accepted practice? Basically wall rack system is one common method. It is a simple method and not recommended for a large volume, but when larger quantities have to be stored against wall, single sided freestanding racks to be used to avoid imposed loading on the

wall and there is something called as End caps. It is you know you properly pack the glass with some nails and steel strapping and then, multiple packs also you bind it and then, fitted to a stabilizer legs and add stability if this is some different ways of storage of glass.

So, basically what is discussed here is we need to have a methodology of stacking or storing the glass, which is very important for the safety.

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We can see the end caps here in the picture. You can see a single pack which will be very you know based on the stability what you can see single pack will not be that much stable. Then, when it is kept to stab 2 packs and then, bundled with the steel strap and all, it is safe or else you have to if you are keeping a single strap, then it has to be with the support thing, but it is shown in this picture.

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Now, another types of you know storage is like toast or bin racks. This means storing small quantities is the best one and construction should include toast bracing along the length of the rack and each must be firmly secured to the floor or to the ceiling. So, this is the way in the picture it is very clear. So, this is the way small quantities of glass what we can store.

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Then, glass supporting on frame. So, this is a way of we know racks used in pairs aligned and suitably spaced and based on the required width of the glass, it is very clear in the

picture how at the both the sides on a frame glass is stored with an angle of inclination, safe angle of inclination.

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There is something called as a frame which is also very common in storage as well as transportation. So, it is kind of it has got a shape of a naive frame and with the cast iron or fabricated angle iron, then both the sides we can store the glass.

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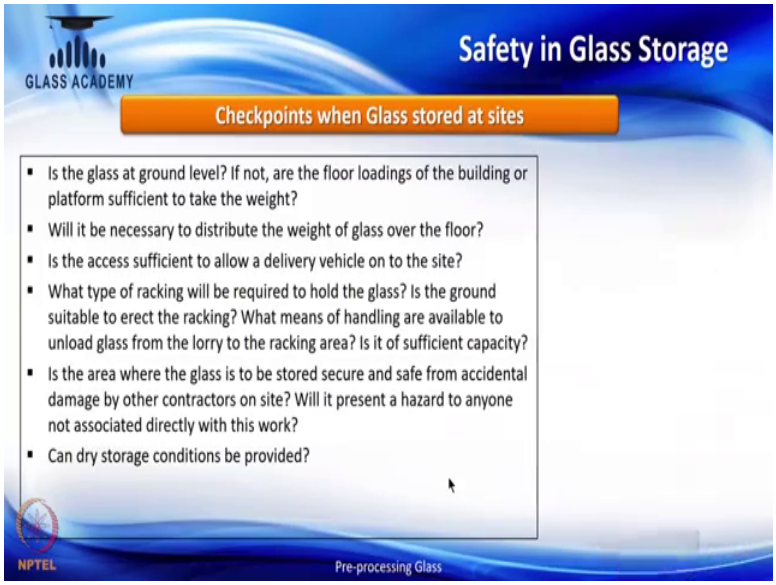

Now, when glass stored that sides there, it is important to have some checkpoints to be followed.

So, I can explain these checkpoints, why it is important and what it is the need to be followed. So, basically we need to check whether the glass is at ground level or not and floor loadings of the buildings or platform sufficient to take the weight. This is what it is very important and it is necessary to distribute the weight of glass or the floor, then if the axis sufficient to allow delivery of vehicle on to the site. So, this needs to be checked at the time of maneuvering to load into the vehicle or unload from the vehicle, there can accidents happen.

Then, what type of racking will be required to hold the glass is the ground suitable to erect that kind of racks and what means of handling are available to unload the glass from the truck to the racking area, then is it of a sufficient capacity whether it is a crane or whatever it mean is the area, where the glass is to be stored secure and safe from accidental damage by other contractors on the sites and will it present a hazard to anyone not associated directed with this work and can dry storage condition be provided.

So, these are all the some checkpoints which we need to take care, then glass is stored at a site.

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Now, that glass is stored, there are four ways with which a glass can fall and then, create an unsafe condition. So, in the first picture, what you can see is it fall sideways and another picture you can see the person how he is standing and the glass can fall on to him. So, that is fall forward and he is very much in the glass falling zone and there is

something called as fall by slipping glass, just slips and then, falls and another way of glass falling is you know when glass is lifted and the person is on beneath the glass, the glass can fall from the top by you know the vacuum failure and the kind of situations.

So, this is what the important thing and every place where glass is stored, there is what we call it as glass falling zone. So, people have to be away or they should not be inside in the glass falling zone.

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This is having said about the warehouse and the ways and means and methodology to safely store glass and handle the glass safely in the warehouses, I would like to share few best practices you know which is used in some warehouses where glass has been stored.

Basically, there is something called a storage limit. You will keep the racks and the runner should be there. So, basically there has to be a limit for the storage. You cannot keep you know empty number of glass and then, keep on storing it and when its crates are stored. So, there is something called as pyramidal stacking. That means, if you are storing on two tires, so the upper tire should be a quantity. What it is kept? It should be lesser than the base tower.

So, that is a pyramidal stacking, then wherever we have broken glass in the warehouse, it needs to be identified and angle of stacking, which is very important and there should be

some means of checking it and ensuring it you know angle of stacking is more than 3 degree and when the truck comes and goes you know there will be a pit actually.

So, that pit needs to be closed. There should not be any gaps and wherever somebody going on top of the truck or a certain height people are working, there should be fall prevention or protection systems should be available and truck driver and glass you know, the glass is always associated with you know people who are carrying it on the roads and then, they come to our warehouses.

So, there should be some minimum safety information need to be passed down to the truck drivers and when on the next point is that whenever we move glass on channel, it needs to be secured. Even on trolley also when glass is moved, glass should be moved with a minimum amount of our basic amount of securing and then, any lifting equipment that is used to handle glass, it should have the safe working load known and respected and there is something called as blind spot in warehouses, where you store glass in between the glass where people pass or this forklift pass or something like that.

There can be a lot of blind corners available. So, all these blind corners should be identified and they should be, there should be convex mirror fitted into that particular area and all the drivers people who work in that area, they should be authorized and there should be minimum speed limits for any material handling equipment that is moved inside the warehouse where you handle the glass moving on, ok.

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There are some f even if we carry a glass on forklift you know it should in the night and all it should be forklift, the headlights should be on and hazardous area there should be good amount of illumination and lighting in the glass warehouses. It is an important point and walkways should be isolated from the storages, otherwise you know people walk and their body is exposed to the sharp edges of glass or a sideways some glass can break and then, fall. That sharp edges will get exposed to the people walking and any wood than glass is commonly found in any kind of warehouses.

So, wood cutting machine, it needs to be properly guarded and then, authorized people only should be doing it. Then, glass when you handle it in EOT crane, all the slings are used, a lot of slings are used. So, we get to know a lot of about unsafe conditions where you know peoplr, their fingers are getting entangled into between the sling and the glass bundles or glass crates. So, that needs to be avoided. Not to handle the slings with fingers and the glass falling zone, there should be constant or frequent sensitization programs on glass falling zone.

People should be discouraged to be there moving or working in the glass falling zone and basically wheel choker for the trucks and then, minimum any 450 mm gap is required between the gaps and there should be if you know pre-operation checklist for all the equipments that is used for glass handling and dedicated pedestrian walkways and the C device finger locking. So, these are all different ways and means of you know safety practices that is been implemented in warehouses.

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