NPTEL

NPTEL ONLINE CERTIFICATION COURSE

Health, Safety & Environmental Management in Offshore and Petroleum engineering (HSE)

Module 1
Safety assurance and assessment
Lecture 9
Organizing Safety (continued)

Dear friends we will continue with the ninth lecture on the first module on the course on health safety environmental management in offshore petroleum engineering under the braces of NPTEL IIT Madras this lecture is a continuation of lecture 7 and 8 where we are discussing how to organize safety in this lecture we discuss certain essential protocols which are important and which can be very useful for a practicing professional engineers in offshore petroleum engineering by the way of which organizing safety can be enhanced some of the excerpts of this work permits etc…are taken from ASSC global ambassador Mr. Jithu Patil and we thank for him for his support for this lecture.

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Let us ask a question what are the factors that generally dry deepwater exploration it is essential to know these factors and what would be the influence of these factors on managing safety we all understand that the energy demand in the global scenario is on the continuous growth traditional fields where oil explosion was happening is now getting exhausted because of shallow and medium water depths availability of oil is highly excluded it also resulted in declining production and reserves and therefore there is an extensive pressure on oil and gas companies to diversify the supply.

Attractive production-sharing contracts are now in place so that your scheme of E and P what we call as exploration production if it is more, more attractive than one can think about a global business link between different oil fields the word and we have already seen there has been a continuous technological advent in designing developing commissioning or at least in RND level of different kinds of platform systems which are essentially meant for ultra deep and deep water oil exploration production there are different platform forms which are dominated in the structural design or in place and I have been attempted by different industries in the recent past.

And of course we all now agree the looking to the economical consideration of this particular sector foreign investments is one of the major source this should be attracted provided if your scheme of ENP is more feasible and more techno economical.

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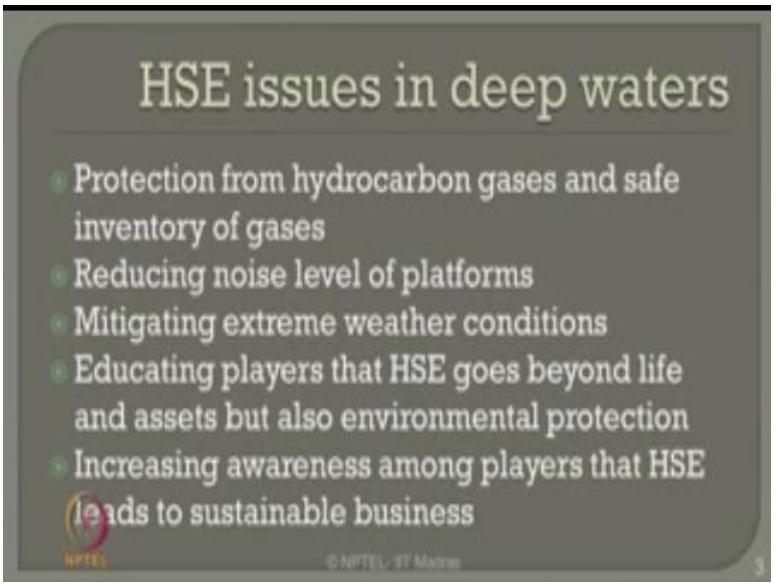

Having understood this let us now see what are those specific issues related to safety in deepwater exploration production we need actually consider a system which offers good protection from hydrocarbon gases and safe inventory of gases we should also know how to reduce the noise level of the platforms in deep and ultra-deep waters one should also understand how to mitigate by design or by process the extreme weather conditions because in the last slides in last lectures we have already seen that accidents have occurred because of environmental or weather conditions happened during either exploration or during production or transportation.

We should also essentially consider seriously educating the players who are involved in HSE and request them to go beyond life and assets but also environmental protection making them important we must create increasing awareness amongst players that HSE leads to sustainable business generally many industries unfortunately friends look HSE as an investment which is loss in the profit which is not correct we must educate people that HSE or safety practice will only lead to sustainable business which will improve production and therefore name and fame for oil and gas industries.

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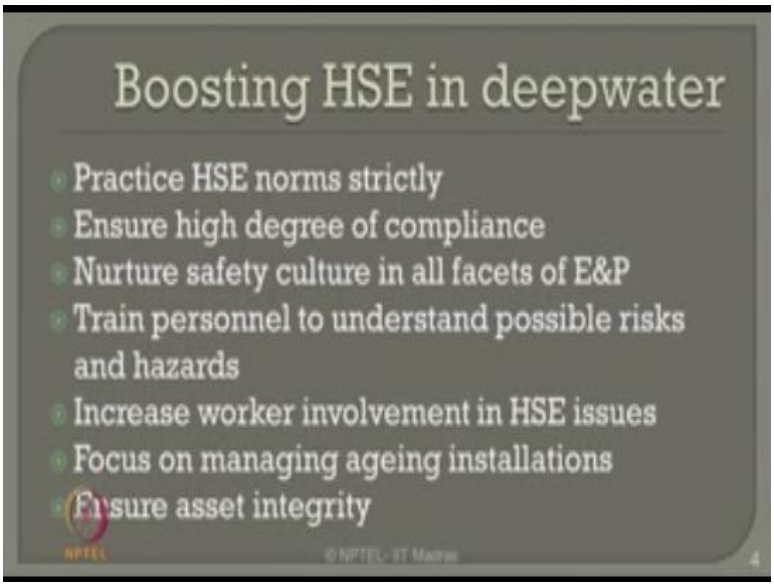

Consent the factors which will contribute to boosting HSE in deep waters we must ensure practicing HSE norms very strictly we must ensure high degree of compliance of all the rule-based regimes in the practice of safety we must also a nurturer safety culture in all facets of exploration and production we must involve constant in continuously training personnel to understand possible risks and hazards this is where this particular course plays a very important role in capacity building of safety engineers in oil and gas industries.

We must involve and encourage worker participation in safety issues this is a very important feedback loop which will enhance safety as a practicing tradition but not as an educational media we must also focus on managing ageing installation this is one of the important problem because many of the installed facilities have already lived their life or leave their production if at least we must pay attention how to enhance the safety if we continue to use these aged installations and of course we must focus and we have been focusing on asset integrity which is one of the important factor which in economic loss prevention as far as safety standards in oil and gas industries or concern.

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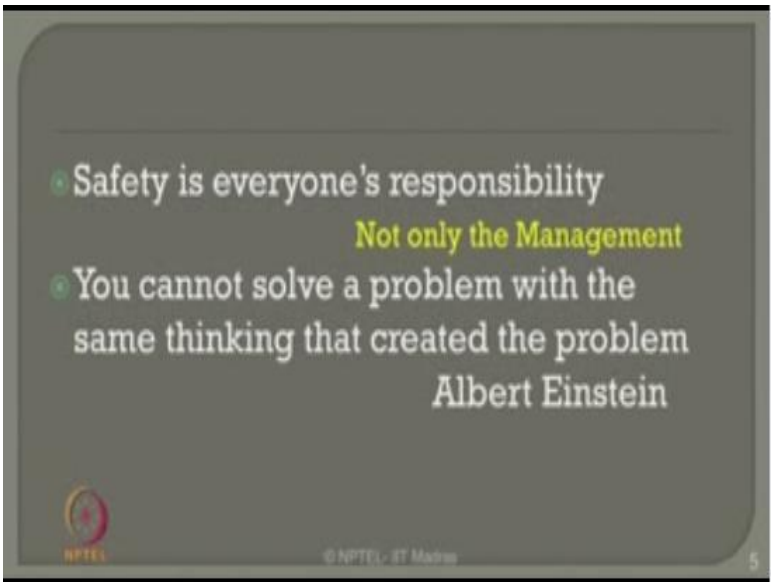

Now let us have a golden saying to understand safety is everyone's responsibility it is not the role to be played only by the management you cannot solve a problem with the same thinking that created the problem as Albert Einstein clearly stated.

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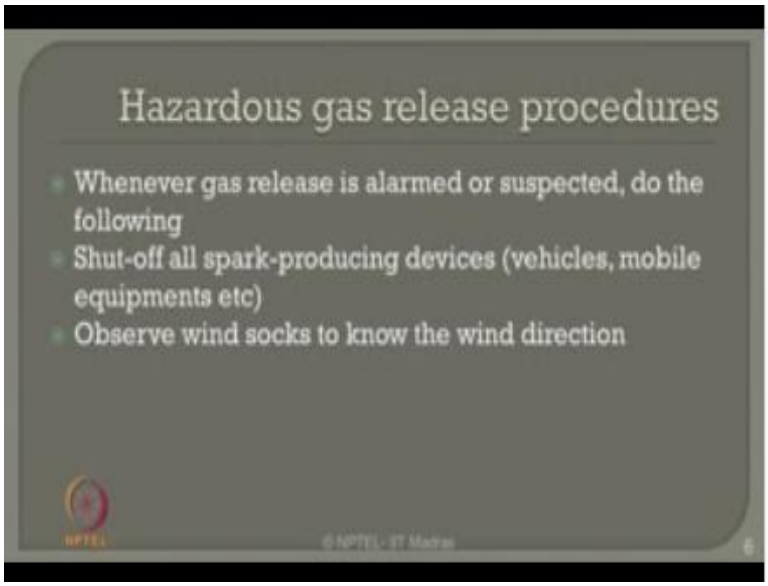

Let us now understand what are the procedures one must follow if you have got an hazardous gas release protocol available in your exploration production platform whenever gas releases alarm are suspected you must train the people to do the following shut off all spark producing devices for example it can be vehicle movement can be mobile equipments etc…

Please request that or instruct that all spark producing devices should be immediately an instantaneously shut off if you feel or sensitize the possible gas release hazard in a working area observe the wind socks to know the wind direction this is very important you must have experience as a practicing engineer or a safety engineer, wind socks plays a very important role physically to identify the predominant wind direction on any given day on any given time. So please observe the wind direction because it is very essential.

To create a culture that organizing safety is very important and every individual should be self clean and self-motivated and directed such that people do not go towards the wind ward direction but they move in the opposite direction. So that if at all any hazardous gas is released it does not spread along the direction where people are moving.

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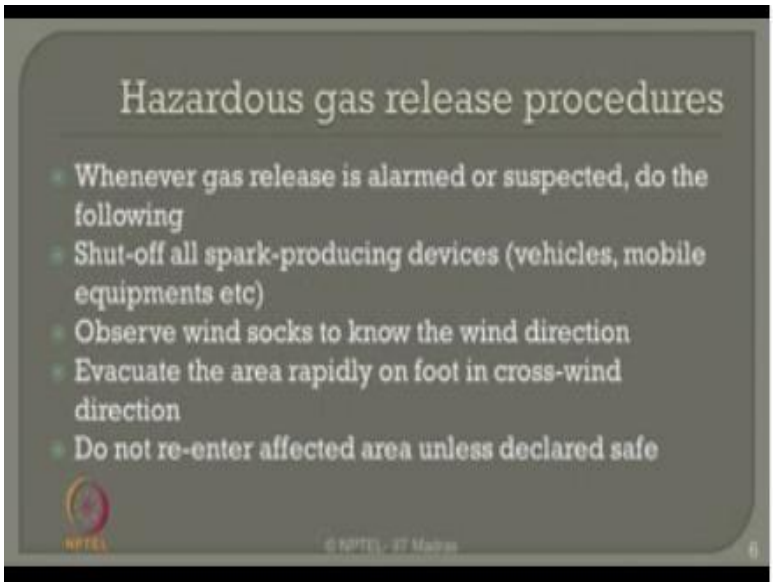

Evacuate the area rapidly on foot in cross wind directions very important, do not re-enter the affected area unless declared safe, this is very important it is not only necessary that you be safe and make a co personal safe but do not try to go overboard saying that you really enter the area affected and keep on saving more assets and people that is not required because you are not trained to do firefighting as professionals of firefighting are enable to do it.

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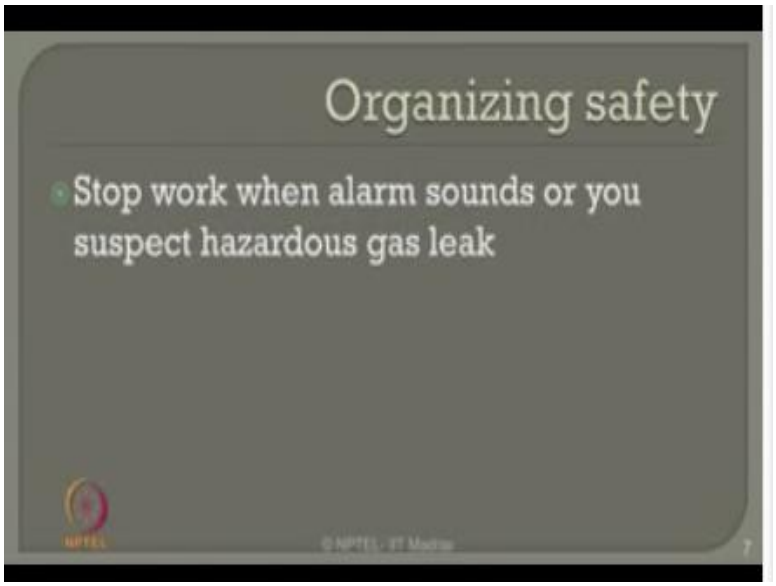

Let us organize again a question of safety in terms of HSE, let us look at the important points which will definitely make important deviations or diversions in organizing safety in oil and gas industries. Stop work when alarm sounds or you suspect Hazardous gas leak plus please understand stopping work does not mean we what storm the complete production to a halt because oil and gas industry is very important that recharging the facilities maintain the operation temperature and pressure is actually a big challenge.

Therefore do not take individual decisions at your level but can you repair the near this immediately to a plant manager so that takes steps immediately does not mean that you have stopped work stopped work in since you must communicate to people about the hazardous sensation which you are experiencing.

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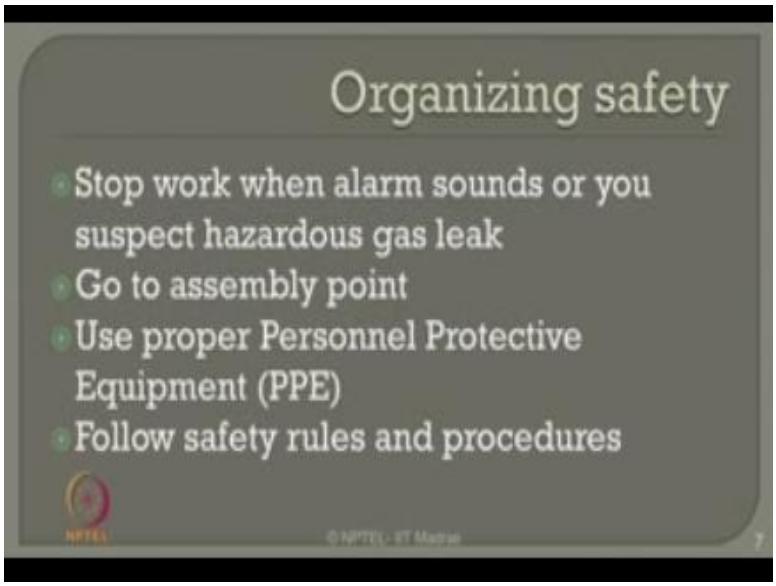

And of course redirect people in yourself to go to the nearest assembly point because every industry has got a safe assembly point which declared and educated to every person working on both, use proper personal protection equipment this is very important briefly called PPE you must know and you must use all the proper personal protective equipments, follow safety rules strictly and adopt procedures given to you or your trainer.

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Every industry should have an hazard identification plan, contractor must conduct hazard identification to us, periodically to identify hazards at worksite, check an obtain certificates for a proper working of all personal protection equipments.

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We talk over fire prevention then this can be achieved successfully by essentially a good housekeeping, controlling a threshold quantity of storage of flammable and combustible material is one important in major step you can do SL the controlling or achieving effective fire prevention, friends fire generally spread only when a good quantity of flammable material is available at the inventory.

So prohibiting smoking in restricted areas will certainly help to avoid or to miss one of the important elements of a fire triangle, firefighting equipment and training should be given to all necessary personal and you must conduct periodic inspection to check whether these devices are working properly and they are in place and they are recharged, it is important that you must conduct fire checks at end of shifts.

This is very important because generally shift transfers or shift hand over's is the point which is vulnerable for fire hazards. So end of shit for fire checks should be carefully examined it should be certified where the person who is handing over the ship who is receiving the successive shift also.

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Please report unsafe conditions and practices to the fire officer or security which is involved in your company.

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Another important area of what people should be educated is emergency reporting, how do you report an emergency situation in your plant?

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State that this is an emergency this very important, describe the emergency very clearly do not try to set panic with people say what is emergency is it because of fire, is it because of gas release because the emergency evacuation ideas and procedures are entirely different for different conditions of emergency because emergency plan of evacuation cannot be similar to that of a fire accident compared to that of a gas release. So do not try to set the panic unnecessarily clearly describe the state of emergency.

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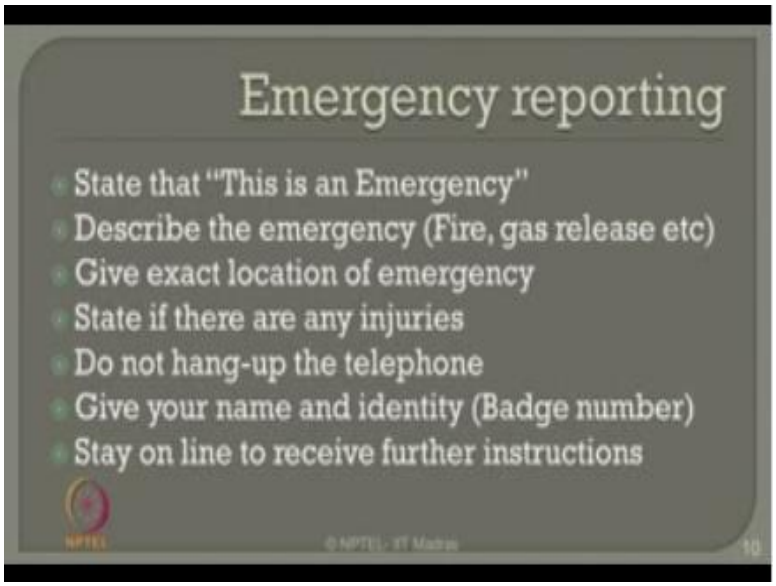

Give exact location of emergency, state if there are any injuries do not try to hide in fact, do not hang up the telephone that is very important, convey the message and leave the telephone available online because people like to contact your fore more information, give your name ladies and gentlemen without any fear and disclose our enmity very clearly with so called badge number who is reporting from where and who is reporting on what.

That is important, stay kindly online to receive further instructions do not take your own decisions in case of emergency because people who are trained for emergency evacuation plan or specially skilled personnel who are capable of instructing people for safe evacuation. So do not take your own decision kindly stay online to receive further instruction from the safety of fire officer who is in charge of safety evacuation plans in your plant.

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Now let us see what are the steps involved in carrying all safety inspection in kind of hydrocarbon process plants.

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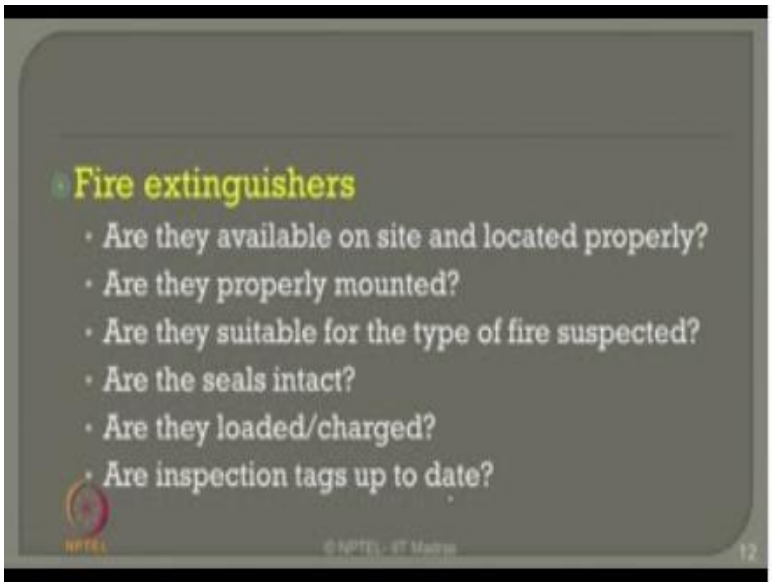

The first and foremost thing which comes in a safety evacuation plan or safety operational list is fire extinguishers, please prepare a checklist based on the questions asked on the slide now or the extinguishes available on site are they located properly are they properly mounted are they suitable for the type of fire suspected because there are different kinds of extinguishers dry wet deluges etc, you cannot use one on the other kind of fire.

Please see what kind of fire is expected from a plant or from a machine shop and try to see and check whether appropriate and proper type of fire extinguishers available in your plant or the seals of the file extinguisher intact or the loaded in charge most importantly friends please check whether the inspection tag is up to date because sometimes on emergency fire extinguishers may be available in position in place, but since they are not reach and they are tested properly you not be able to use them effectively.

So please constantly keep on inspecting this and this check list should be prepared at least once in a month and you should be keep on ornamenting this so that the fire officer is informed about any lacuna available on these questions as far as fire extinguishers are concerned.

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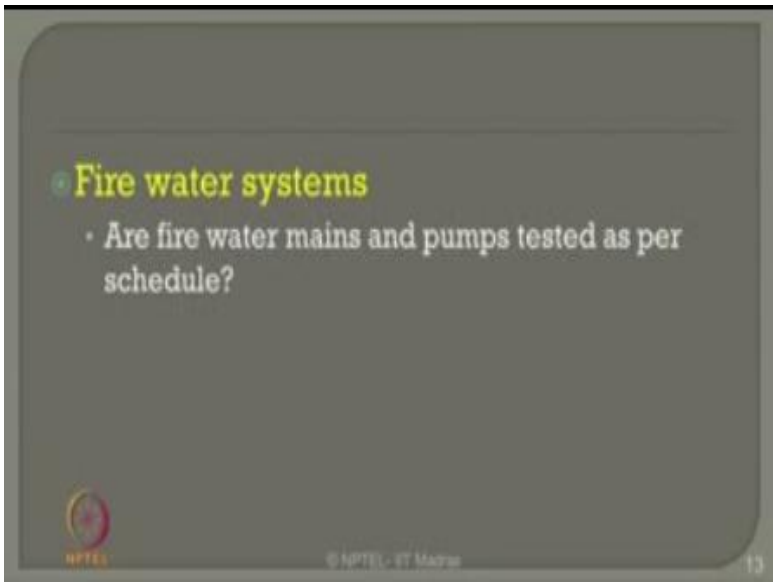

The next list comes is a fire water systems or fire what remains and pumps tested as per schedule because this is regularly inspection check which should be scheduled for checking the fire water mains so that they are in position and they operate in a required pressure and temperature.

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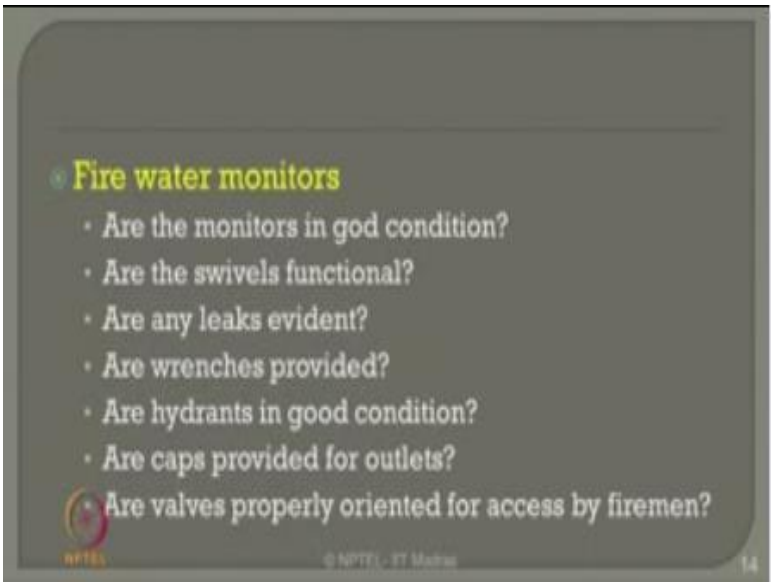

The next one is the fire water monitors, are these monitors in good condition, are the swivels functional, are any leaks evident, are wrenches provided in place where they are to be provided, are hydrants in good condition, are caps provided for outlets properly and they are closed, are all the valves properly oriented for access by the firemen is very important sometimes in case of fire the valves becomes inaccessible for the fire fighting personnel. Please see that these valves are properly oriented and they are properly display and a chalk and the list is available on the plant for a fireman easily locate in case of any emergency.

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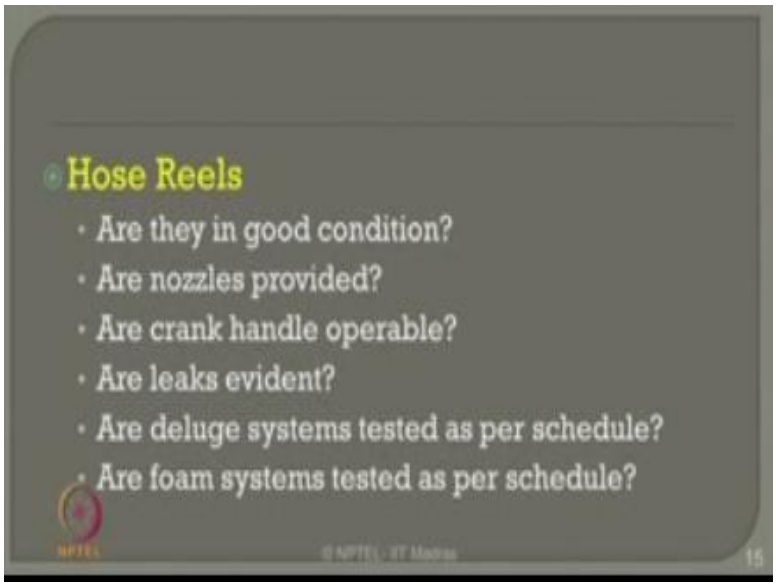

Talk about Hose Reels one must check whether they are in good condition, whether the nozzles provided to the hose reels are available, are crank handle operable sometimes it is very clearly and commonly seen that the hose reels crank handle are damaged and you cannot hold the hose reel for firefighting. Sometimes these hose reels being kept in a closed conduit condition there can be enough leaks available in the hose reel, please check that they are leak proof and also check whether the deluge systems available in your place, are properly tested as per the schedule.

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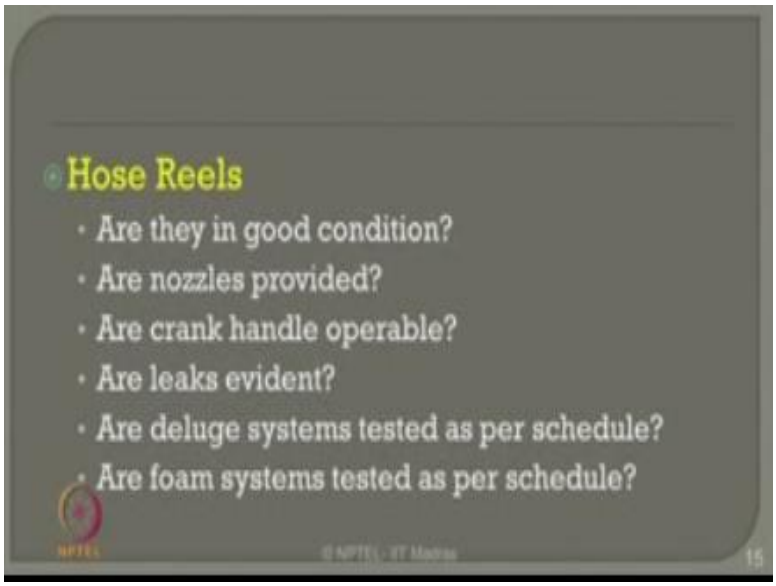

Are foam systems tested as per the schedule?

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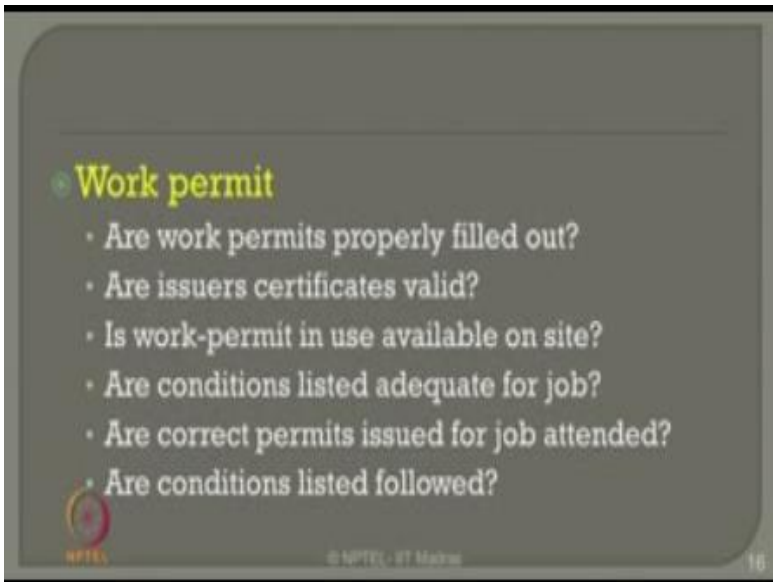

Come in the next point is a work permit is one of the important area where people generally force see lot of lacuna which results in hazardous situation or which results and ripens into a serious accident are work permits properly filled out, that is very important? Are issue certificates valid? Is work permit in use available on site for reference or conditions listed adequate for the job. Are correct permits issued for jobs attended? Are conditions listed being forward strictly during the work permit?

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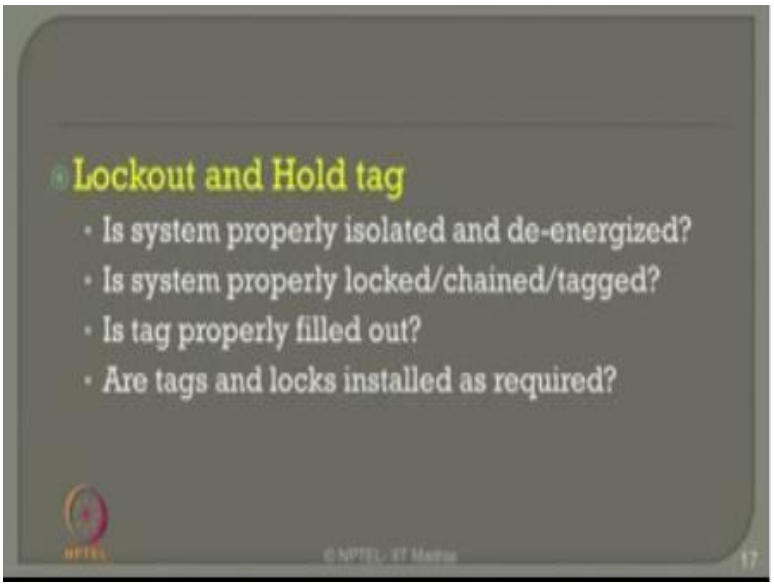

The next important which is also equally necessary like a work permit lockout and the hole tab. Certain areas during work permit you do not allow access for personal, this called a lockout area or sometimes the work is continuous you causes an hold tag, you are suspended the work for some requirement of an inventory or a material or for a specialized personnel so you have to put a hold tag. So please check a system properly isolated before you carry out such work permits and is the system de energized is very important because we all understand that after plants do check.

Is system properly isolated and de-energized, please check that in operational systems and offshore and oil gas plants, the plants work on a specific temperature and pressure. So please note that de-energized should be carried out before the work permit, are the work area is isolated for carrying out any repair. The system properly locked, chained and tag, so there is no misuse of the system while displaced is being carried out.

Is a tag properly filled out it must have an authorized signatory who is allowing this kind of isolation and the whole tag. Are the tax and locks installed as per the requirements of the personal safety equipments?

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When you come to personal protection which is very important and very adapting let us see what are the steps to be asked and what are the questions to be follow, so that personal safety is at most achieved.

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Are suitable personal protection devices available safety shoes, eye protection glasses, helmets, gloves, aprons, ear plugs extra are they available in place. Is evacuation plan clearly explained available and tested in case of emergency. We all understand especially people are working in the industry know people used to conduct what is called as a fire drill. Fire drill is a non drill conducted once in a periodic interval. So the people working on board are given a proper physical one is to one and scale training so that in case of emergency they know how to react and where to go.

Whereas students were listening to the lecture please understand if possible visit a plan to know what is an emergency evacuation plan, how people are conducting fire drills.

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Are people trained in emergency rescue procedures is very important in many situation hazards right when accidents only when the personnel are not train to add during emergency. It is very important because generally during emergency people tend to take their own psychological decisions which is not admitted and not good in case of safety organization in HSC.

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Special protection devices are the provider and used safety belts, air supply hoods, chemical goggles, life vests, TEL canisters and gloves extra are the available in plenty and are they being used properly.

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Generally post accidents can be always mitigated well if you have got first aid equipments in place. Are safety showers and eye wash equipments available? It is very important friends in case of visibility requirements goes lower and lower, eye irritations goes higher and higher people generally become panic. So you require what is called eye wash equipments in available in place and sometimes safety showers we call they should be available in place because you want to protect and prevent first level bones from people you must have these kind of facilities available as a first aid equipment in a plant or they available within a specific range of about.

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4 to 4.5 meter of the potential hazard, you should not search for them it is very important that depending upon the location where such experiences can be seen as a nervous in the past try to provide these kind of facility is a first aid equipments within the closest possible range our first aid kits provided on job sites please check them or temperature pressure and quality of water available firefighting is satisfactory.

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Talking about lighting is slicing adequate available in your plant is lighting suitable for electric area classification because there is a really standard procedure available in the literature to classify the amount of rating available for electric area as well so please check whether this Is sufficing a plant if not insist on improvement on these kind of safety standards do lighting fixtures need immediate attention sometimes these setting fixtures may be corroded may be bending might we have seen cracks there are loose bolts so they will cause hazard situation because they will result in electric spark immediately.

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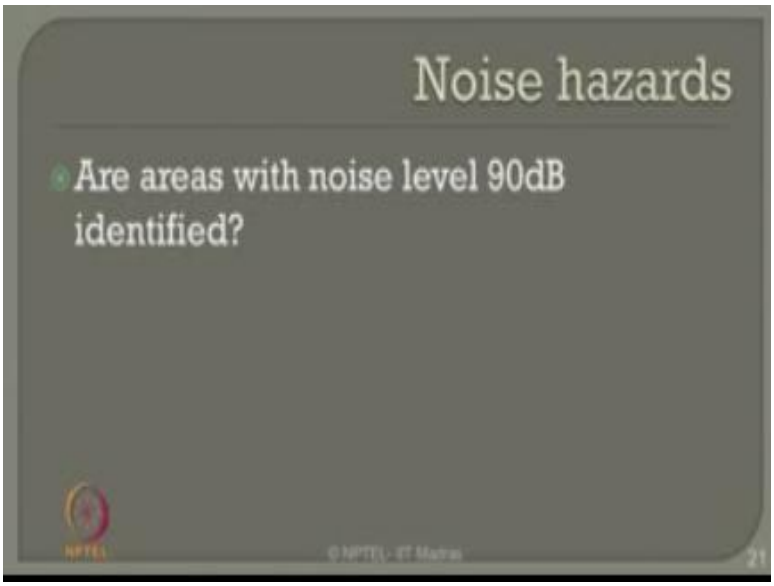

Coming to the noise because this is one important area where people cannot communicate each other when the noise as odds are very highly unacceptable or areas with the noise level 90 decibels are identified have you identified them in situation do people wear personal protection devices are these areas labeled for.

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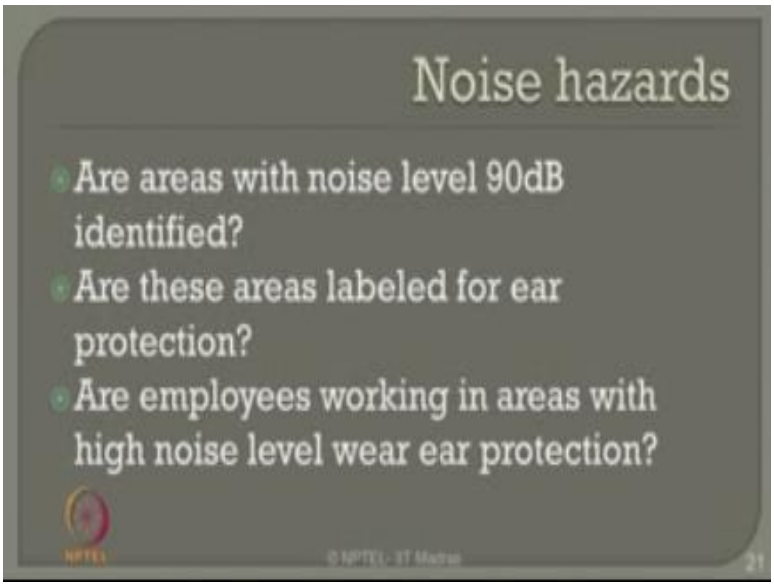

Ear protection or employees workings areas a high noise level wear ear protection devices you must ensure this by periodic inspection conduct survey and report this to the plant executive so that this should be insisted very carefully because in most of the cases it has been observed that when people do not wear ear protection devices where the noise live is very high communication becomes half way when the communication is not effective then it results in a disaster which causes very serious accidents in process plants.

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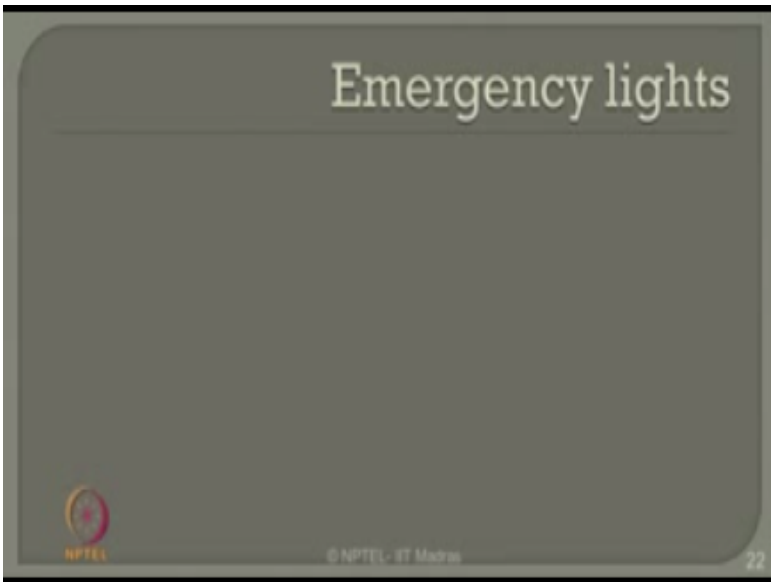

Interestingly we have seen in the case studies power shuts off when there is an emergency organ is an accident so let us see what we talk about emergency lights in case of organizing safety or the first place available in your plant are they in working condition please do not take granted the emergency lights placed in position or available working condition the battery should be available in recharge denote the emergency lights tube should be properly placed they are located and you must know and check whether they are in a proper working condition he is a liquid level in the battery is satisfactory this is the very important check which one must perform which is kindly.

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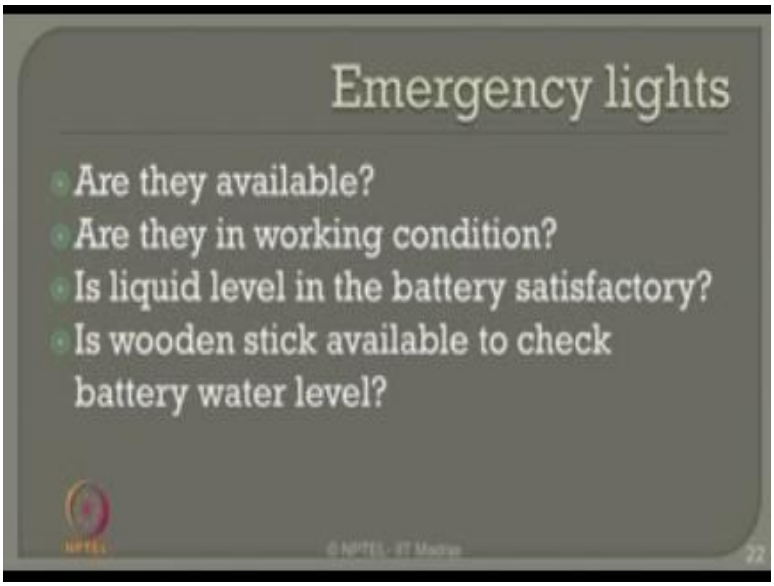

And most commonly ignored in many of the plants he is wooden stick available to check the battery level this is actually these are the lists available in most of the places where people carried out successful safety organization procedures which has saved lot of accidents please do not ignore these minor points because they will know they will come to rescue when they have been asked to.

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People generally drop the hand tools and power tools then and that in case of emergency let us check whether these tools meet standard requirements or the free from defects or non insulated electric tools properly grounded that is very important because it develop short-circuit and that caused a lot of panic and results in serious accidents in case of any power failure or why is free of defects because this is the place where wires of a longer length subject the high wire enter and tear may get exposed off the insulation would have been opened and you must check whether these wires are free from defects.

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One of the important source of accident unfortunately friends in oil gas industry is the cranes his crane operator essentially and very clearly certified to operate the specific type of grain is very important most probably in most cases in shift handles people try to compromise on the crane operators manner ability capacity or the crane operators insufficient training please check whether the crane operator who is operating the crane certified to operate a specific type of crane every operator cannot and he is not certified to operate all types of cranes.

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Does the claim as a valid inspection sticker placed on it which is certified when authorized signatory is a trained and certified personal available.

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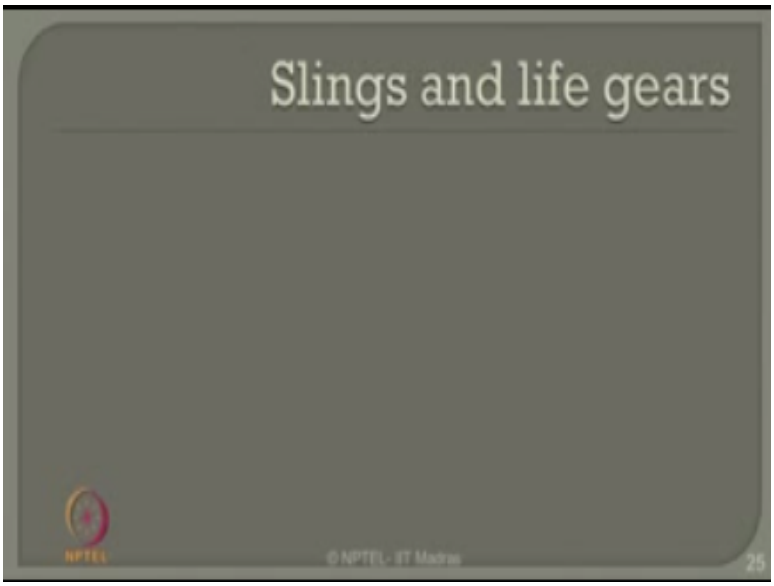

On boat to operate the case most importantly ladies and gentleman slinks and life givers becomes very important source of causing accidents.

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Is the load exceeding safe working load because every sling on a light gear system in a crane is specified with what is called as an SWL which is called safe working load or safe factored load this is specific for every sling rope wires etc. Please check whether these loads is exceeding by any way of operational standards he is a hook.

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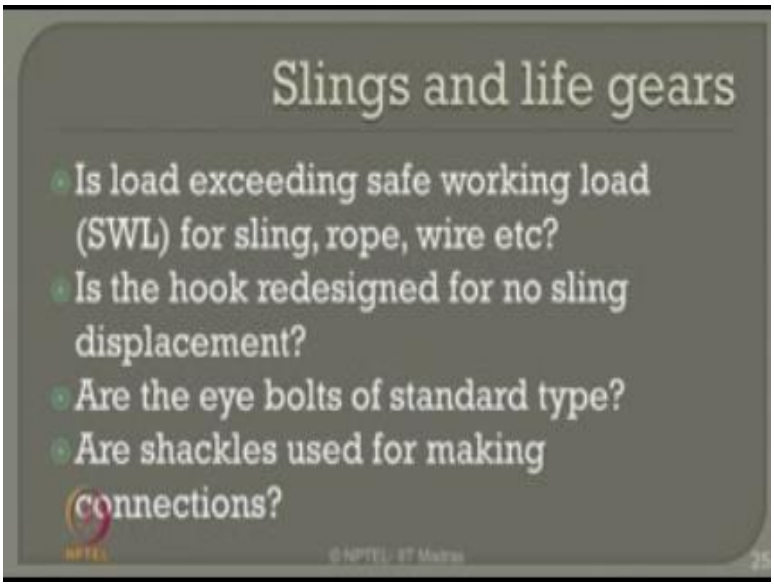

Redesigned for no sling displacement that is very important because the sling is not displaced properly it may land up in drop-down of the objects which cause serious accidents or the eye bolts of standard type provided in the crane is very important or shackles used for making connections or they are simply tied up with the very words because there is a standard procedure by which you have to hold down the object to the crane hook the top in a chemical store one should also understand his emergency showers and eye wash is available near the chemical store and they are repairable is proper.

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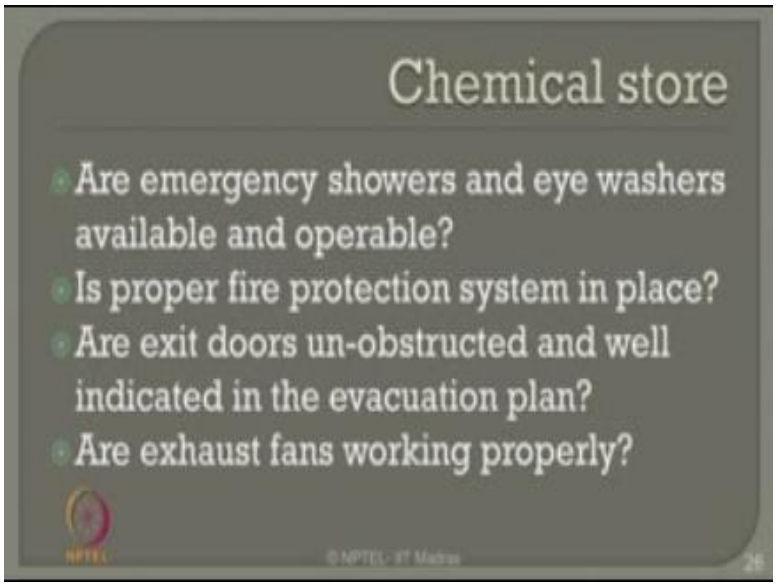

Fire protection system in place available with a chemical store or exit doors un-obstructed and well indicated in the evacuation plan which is specific near the chemical store or exhaust fans working properly because incase of chemical disasters it has been observed that the gaseous hazards released the environment caused a lot of tenacity there it is not causing the challenge of life of people but it results a lot of penalty which results in a very serious accident.

So let us check whether the exhaust fans are working properly so that the gas if release is this based environment and the content concentration of the gas release is brought down as early as possible.

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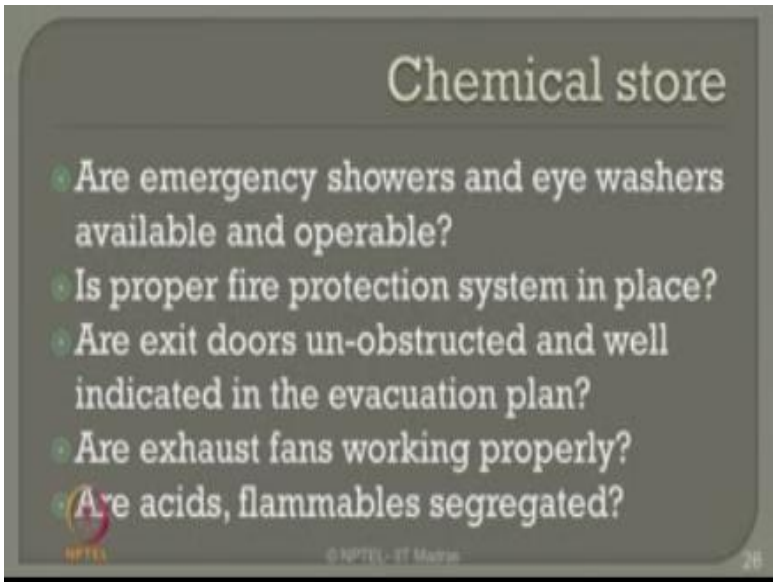

Our assets and flammables segregated in the chemical store that is very important because both of them are living in different chemical characteristics and that can cause lot of issues.

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Let us talk about relief walls we always considered mechanical systems as one of the default friends which will come for a rescue in case of emergency which is not the case in many accidents as seen in the recent past.

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All these relief valves painted properly and they should be for example painted in orange or the bellow type valves properly vented because if the venting is not proper the venting is shut down by mistake these walls do not operate successfully are all the relief valves discharged properly that should be also checked.

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Instantaneously and periodically let us talk about the checklist available for electric accessories or they kept in explosion proof box are all conduits supported properly for all conduits free of cracks corrosion and other defects are they grounded properly and they are intact talk about tanks pumps compressive areas or the dike valves free of cracks are entry in exited dike valves flue a pump section because these the place where you must give enough accessibility to people.

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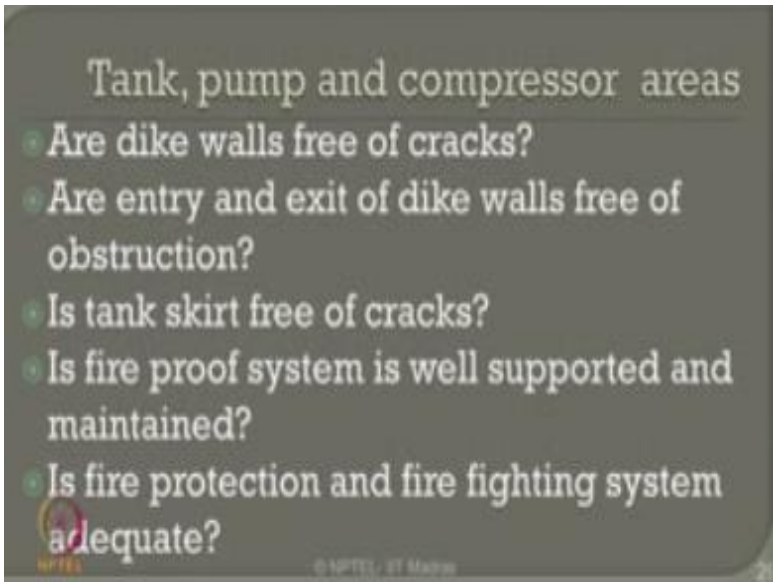

Is tank skirt free of cracks is fire proof system well supported and maintain, is fire protection and firefighting system sufficient and adequate for firefighting in the tank pump and composite areas.

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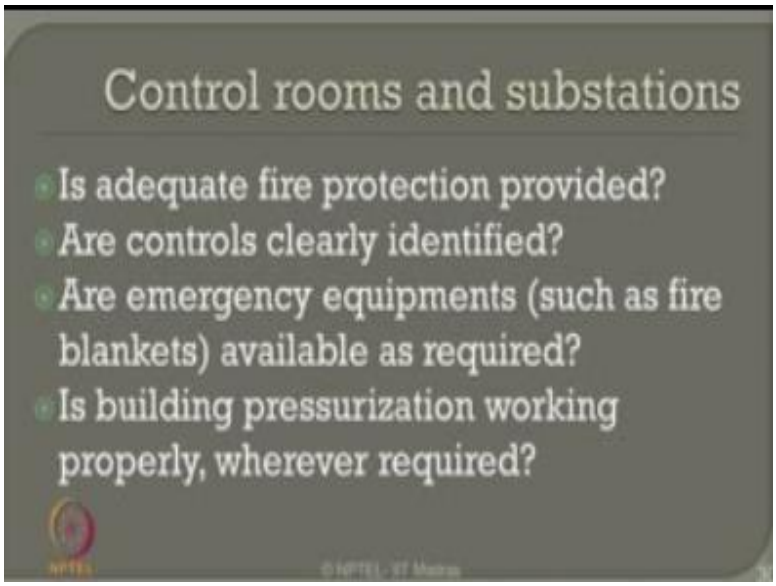

Where it also checks the control rooms and substations available in the plant are the adequate with fire protection devices or controls clearly identifying or emergency equipment such as fire blankets available as required and stated in the rules and regulations is building pressurization working properly wherever required to do that.

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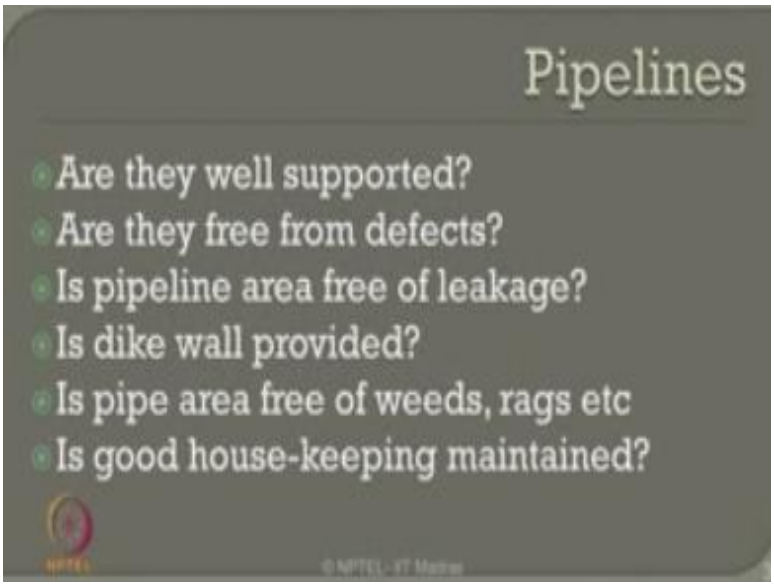

Let us check also the pipelines in place or they well supported are they free from defects are they free from leakage is dike wall provided around the pipe line or pipe rags is pipe area free of weeds and rags this is the place very important where this will lead to lot of deposition which can cause corrosion on the pipe material on the external surface you may not even notice because of the weeds growth and the rags around the pipe circumference.

Therefore we must focus on friends is it a good housekeeping maintenance done in the plant because this can prevent lot of double points which can enhance and ensure safety in a given wall.

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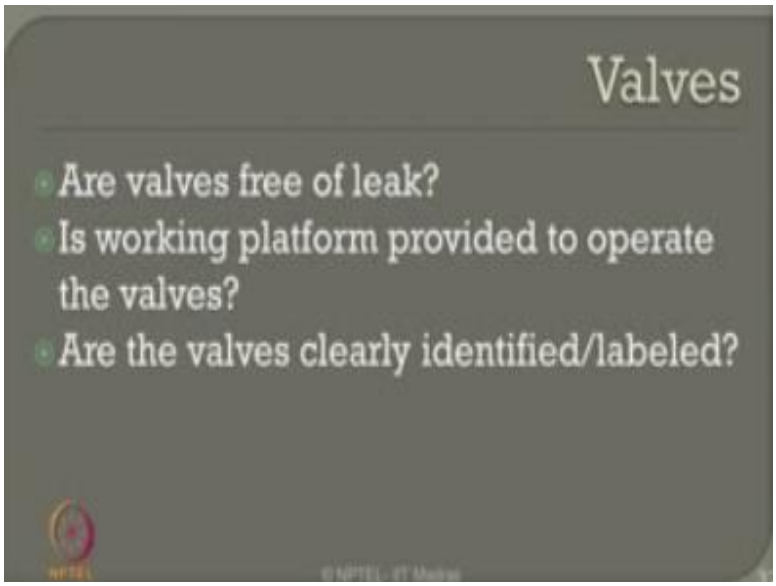

Let us talk about the walls as well or the walls free of leak is working platform provided to operate the walls because in most of the cases the working platform is not comfortable to operate a valve therefore let us see are the available in a comfortable situation all these valves clearly identified and labeled.

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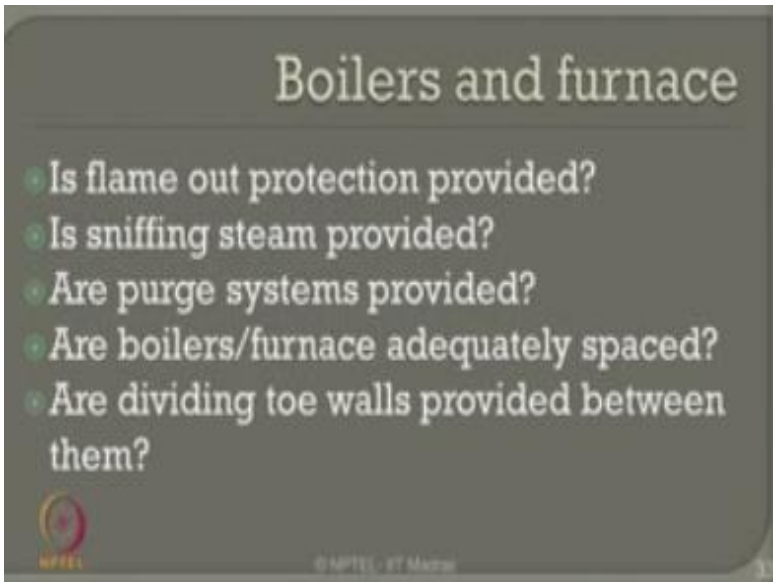

Let us also talk about the boilers and furnace is the flame out protection provided in these boilers and furnace his sniffing steam provided so that the quality of our disposal can be controlled under the regulations or persistence available because you want to reduce the concentration of gas release if it is expected or boilers in furnace adequately spaced you cannot keep them closed because they operate in a different temperature and pressure proximity of them will cause lot of accidents as an unfortunate situation in many cases.

Are dividing toe walls provided between them so that they are isolated in case of any emergency requirements?

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Let us also see how the check protocol works generally all these lists which has been tested and certified should be signed by a plant engineer who is designated a safety engineer in the plant this should be conquered by a four man who is responsible for every shift and it should be approved fortunately they plant superintendent so this is a very important document. All these check lists must be tested certified and then to be pasted on record so that one should know that these safety procedures are periodically inspected and followed and they are adhered to.

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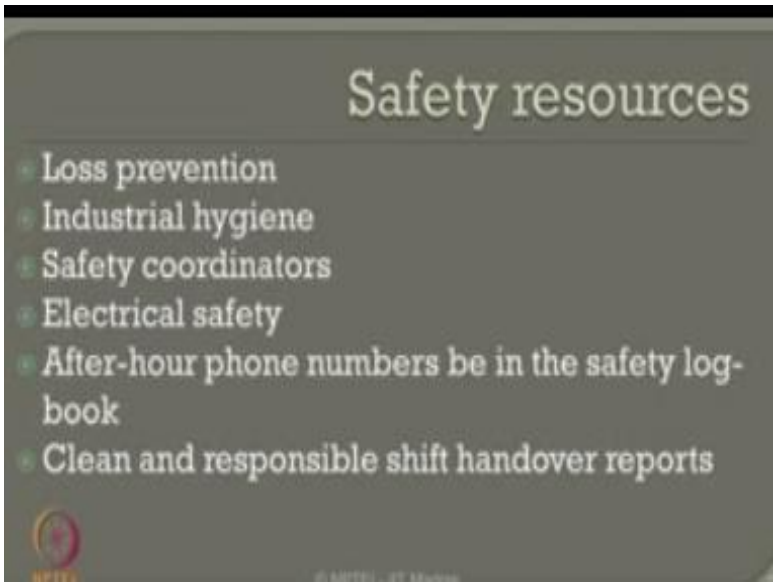

Let us quickly see what are the safety resources which comes in play loss prevention industrial hygiene safety coordinators electric safety after hour phone numbers in the safety log book friends the last point is very important because generally in a safety logbook the after hour phone numbers are not written properly in case of emergency the plant personnel has left the plant because Duty is lower he must be available or at least phone number for contact should be available.

Because generally you can clearly indicate or you will try to understand what are the safety violations which was expected by him in the previous shift or in the previous day. So after hour phone numbers should be mentioned the safety log book as a part to the document clean and responsible shift handover report is a very important document which can enhance safety for sure in any process industry my dear friends.

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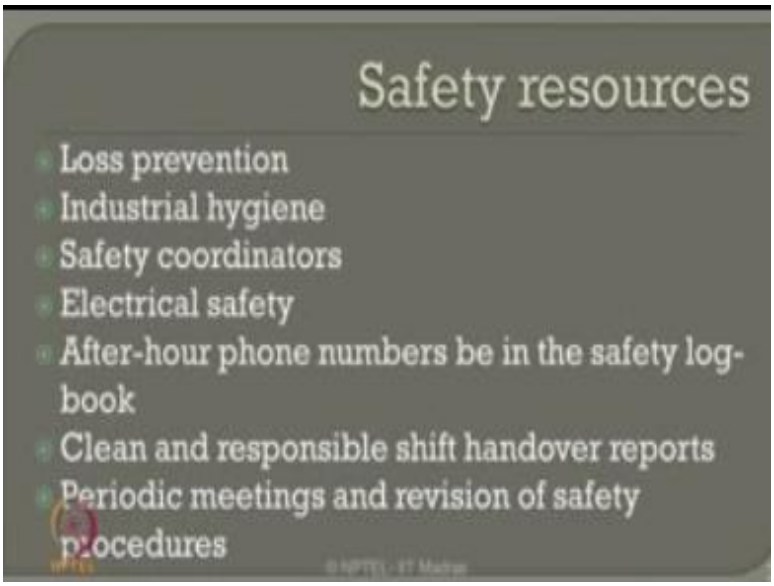

You must conduct periodic meetings and you must revisit safety procedures you must involve personnel.

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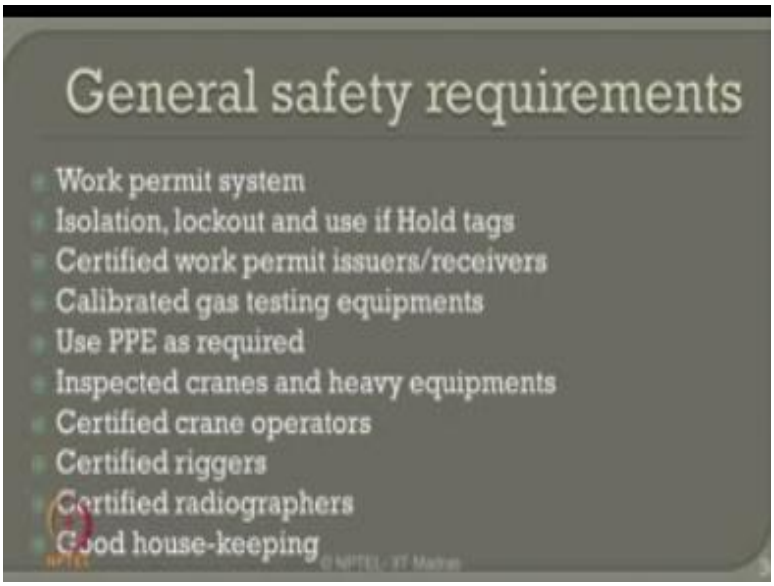

Who are interested to safety what are the general safety requirements which we must now conclude work permit system isolation lockout and use of whole tax if possible certified work permits you must also guarantee the certified issue as a receive as a work permit calibrated gas testing equipments use plant personal safety equipments as required inspect cranes and heavy equipments periodically certified crane operators should be only interested to operate cranes.

Also certified riggers should be used to operate the rig's certified radiographer should be allowed to carry out radiographic surveys etcetera. Most importantly kindly encourage a practice of Good Housekeeping because this can prevent lot of accidents in a major disaster situation as seen in the reason past.

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You must designate smoking please very clearly you must observe speed limits within the plant you must make fixed operating hours, friends most importantly kindly try to avoid over time and shifts spillovers because this will cause lot of work fatigue to people which results in major accidents.

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Use safety logbook and maintain it under the custody of the safety plant engineer.

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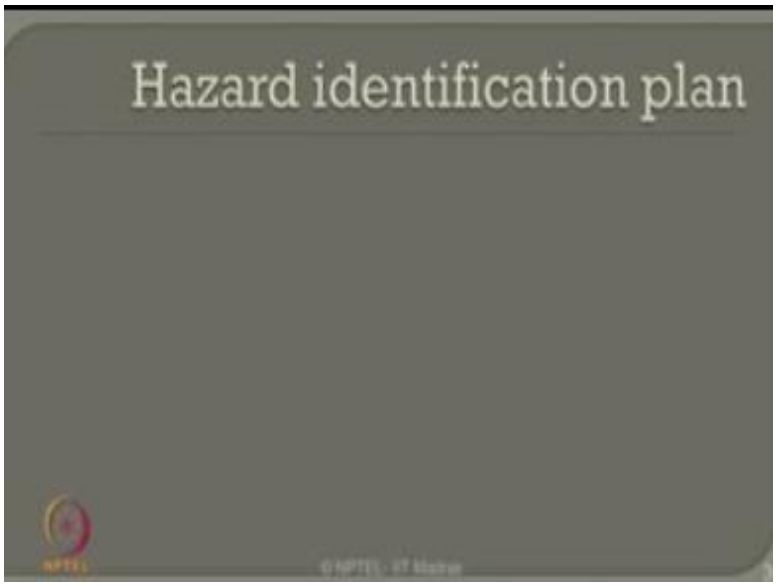

You must also prepare very importantly called hazard identification plan which is called hip, hip is one of the important concept one important component of human being similarly hip is a very important component in any considered process safety management.

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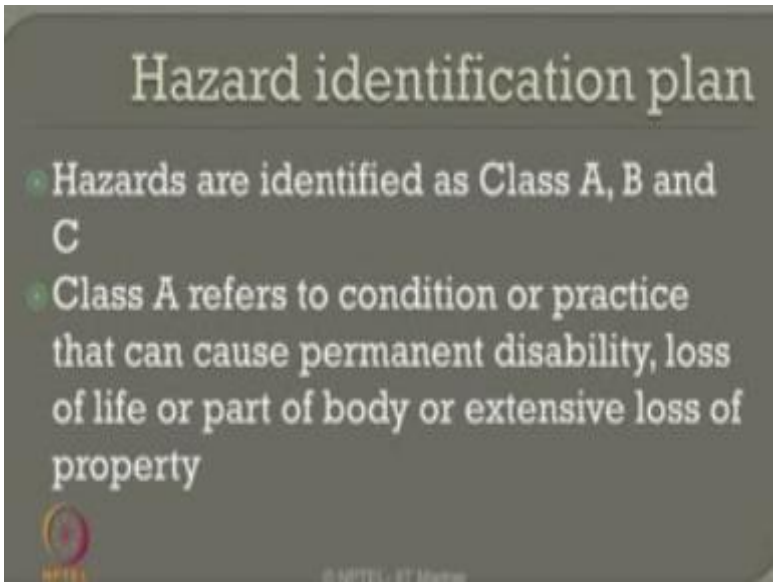

Hazards are generally identified as class ABC class A generally refers to the condition or a practice which can cause permanent disability loss of life or part of body or con cause extensive loss of property this is called classy hazards.

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Class B hazards referred to condition or practice that can cause serious injury or illness or property damage but they are less serious compared to class A hazards class C of course refers to the conditioner practice that can cause minor injury or illness or minor damage to the property so relatively class A hazards are more dangerous which can ripen to accidents compared to that of Band C however nevertheless a B and C are equally important one must prepare hazard evacuation and identification plan for different categories of hazards.

All these issues come under a single concept called job safety analysis very briefly called JSA is a process of determining physical requirements in nominal conditions and safety factors those are related to specific job or task so every job has to be performed with a JSA.

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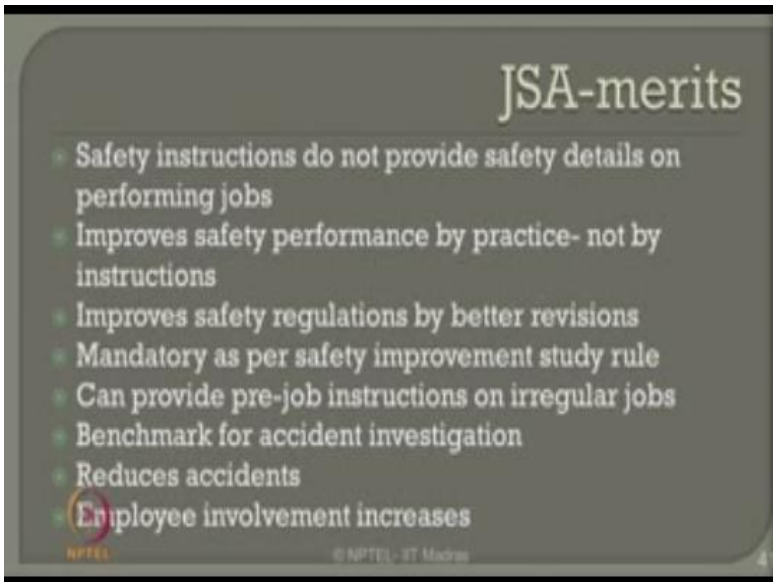

What are the different merits you achieve by performing a JSA safety instructions do not provide safety details on performing jobs therefore job safety analysis improve safety performance by practice not by instructions it improves safety regulations by better revisions it is mandatory as per the Safety Improvement study rules which has been now implemented in oil and gas industries in the reason past he can provide pre-job instructions on irregular jobs it is very important because job safety analysis will try to project on different hazardous situations which are not otherwise seen in safety as an endanger.

It is a benchmark for accident investigation it reduces accidents more or less in a given plant more importantly friends it increases our enhances the employment employee involvement in JSA.

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That is a very necessary for improving safety therefore what are essential objectives of such analysis to identify possible hazards to eliminate hazards where do you perform JSA very interesting patient jobs where most accidents and near miss are reported we must perform JSA for them jobs with potential for serious injury should be always reported under JSA jobs that are categorically new should be generally done under JSA jobs.

That are repetitive catches more focus under JSA because they are the jobs which are causing more extends because people think their experience to handle situation therefore they can always be ignorant ladies and gentlemen in this lecture we discussed essential protocols of preparing reports surveys which can form an important document for organization safety we have seen the benefits of job safety analysis we have insisted on how personal safety protection equipment should become mandatory for people and how the employer involvement and employee involvement safety can be enhanced in a process industry thank you very much fizzling to the lecture 9 on HSE and NPTEL IIT Madras.

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Funded by

Department of Higher Education

Ministry of Human Resource Development