Lecture – 53
Pigging

Welcome. Today we shall be looking into one operation that is not directly related to the processing of the natural gas, but nonetheless it is quite important for the maintenance of the various types of pipelines in the natural gas systems.
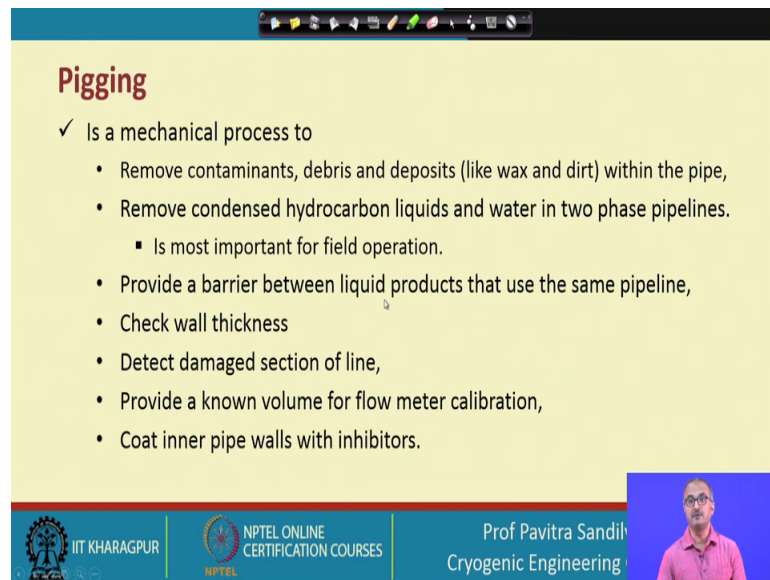
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So, in this lecture we shall be talking about this pigging operation. And we shall be looking into pigging, the classification of pigs, the selection criteria of pigs and optimum pigging frequency.

Now, first let us see what is pigging. Actually the word pigging came from the sound made by the pigs because in the initial it is what happened that the pipelines where getting sometime clogged by some debris or something then people started using some kind of barbed wires to remove those debris. And when they put the barbed wires to the pipelines it made some kind of squeaking sound that sounded like the sound of a pig.

So, that is how the name was derived as pigging, but now this pigging as become a method to clear and clean the pipeline. So, this pigging is a mechanical process to remove contaminants, debris, deposits, like wax, dirt, etcetera which are there in the pipeline. Then it resume used to remove the condensed hydrocarbon liquids and water which are in two phase pipeline, and it is very important fall for the field operation.

Then this pigs provide a barrier between different types of liquid products, which are going for the same pipeline. So, that one side class one particular product then I put a pig and this pig will kind of a like a barrier and then after the pig again I will put another kind of liquid product. So, that is how the pigging the pigs are able to segregate different qualities of the products.

Then, if there are any kind of deposition on the wall of the container and if the deposition becomes too much then what happens, that the there will be more resistance to the flow of the fluids. So, in that case to check this thickness of the various types of deposits this pigs are used then this pigs can also be used to find out the damaged section of the line

and by putting some kind of sensor over the pigs we can detect the damage in the pipeline and to provide a known volume of flow meter calibration.

So, I can fix the amount of the fluid to be passed between two pigs and that is how I can calibrate some kind of flow sensor. And sometimes we need to coat the inner pipe walls with some inhibitors. For example, in case of natural gas if I want to prevent the hydrate formation then the inhibitor may be coated onside the inside the pipeline using this kind of pigs.

So, from the initial days of removing the various debris the contaminants now the pigging operation is done for many other purposes in the processing of the natural gas and petroleum.

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Now, here the working is like this that the solid plug is forced out through the pipeline and this plug is forced out by using some kind of a mechanical plunger or a pig. And the fluid is pumped upstream of the pig to set into motion because the if the pig does not moved because generally when big is solid and the pipeline is also solid. So, pig may not be able to move on its own. So, what we do that we on the upstream of the pig we put some kind of fluid that will make the reduce the frictional resistance between the pig and the pipeline and that is how the pig will be able to move easily through pipeline. And then there is a pig launcher which inserts the pig into the pipeline and similarly on the one end we have the launcher and on the other end of the pipeline we have a pig receiver

which removes the pig from the pipeline. So, that is how the whole operation of pigging is done.

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Then there are various types of pig materials. Earlier as I told you that it is to be a barbed wire which was wrapped around some kind of bunch of straw and that is how that name came about, but now it is this pigs are made from different types of polyurethane foam.

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And here we have some classification of the pig depending on the work they are supposed to do. So, we have utility pigs which are basically for used for cleaning the

debris like solids or semi solid and then separating the dissimilar products within the pipeline or during the dewatering. Then we have inline inspection pigs as I said earlier that these are used this kind of pigs are used to detect any kind of failure or the leakages inside the pipeline.
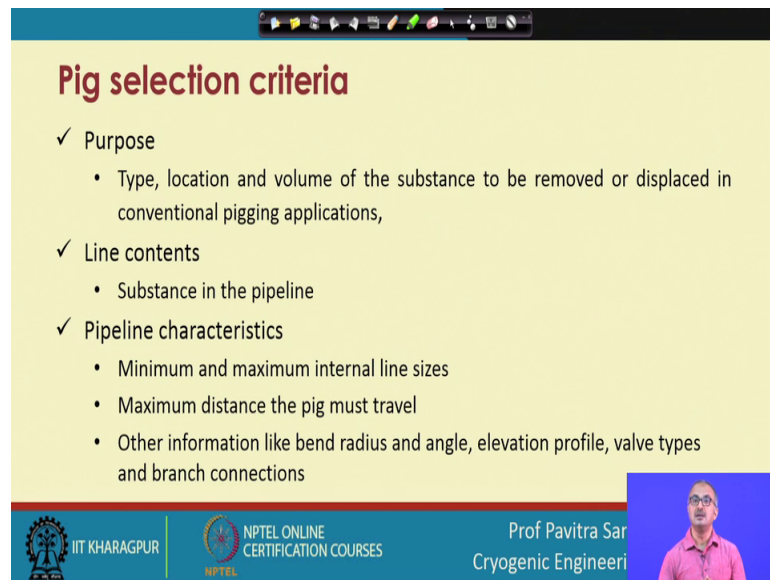
So, they are basically to know the condition of the pipeline and the extent of the damage and location of the damage within the pipeline. Then we have gel pigs then these are used in conjunction with the conventional pig to optimize the dewatering cleaning and other drying tasks and then we have tricks to isolate the section of the various pipeline.

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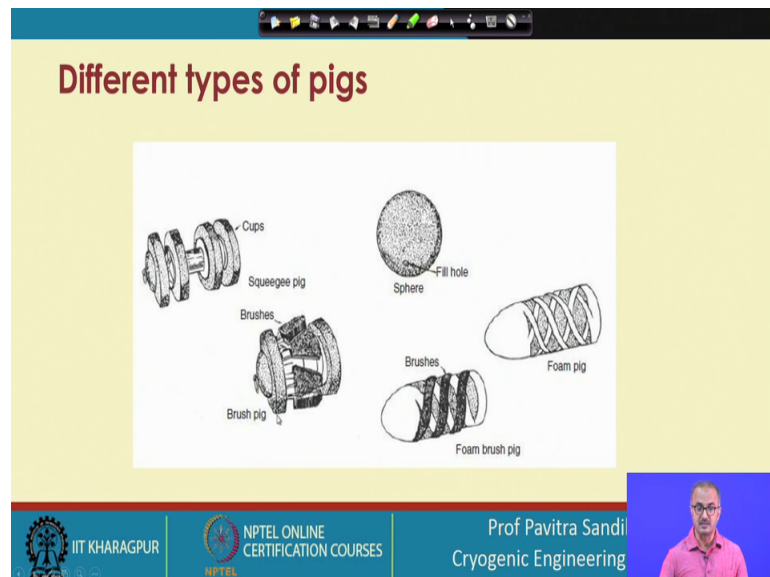
Now, here in this particular figure we are showing the various shapes of the pigs which are available commercially. So, we can see that the pigs coming in different shapes and these depending on the type of this pigs we can perform different types of the perform jobs with the pigs. And here you can say some have brushes on them some have cups on them (Refer Time: 06:31) foam brushes and they have foam pig. So, all these different types of pigs will be performing different types of functions.

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Now, how to select this various types of pigs? First is the purpose, the we have to understand that what is the type of application we wanted for then where it is to be done the location and the volume of the substance to be removed or displaced in the conventional pigging application.
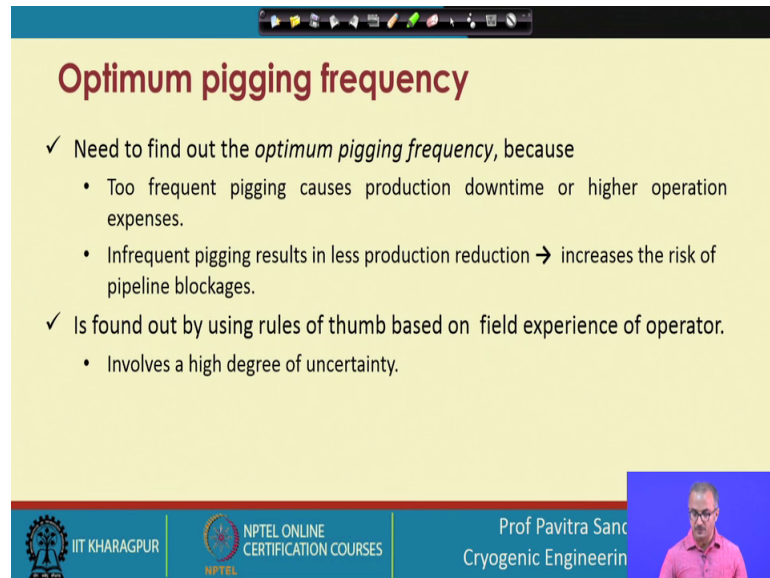
So, these are once the purpose we define the purpose of pigging accordingly we will choose the type of the pigging operation. And then we have the line contents, then what are the substances which are going in the line whether it is fluid, whether it is liquid, it is solid or some slurry or whether it has some kind of precipitating substance within the fluid all these things need to be considered for selection of the pig.

And next we have the pipes and characteristics in this we have to know that what is the minimum and what is the maximum internal size of the pipe. That means, the inner diameter that will decide the diameter of the pigs and the maximum distance the pig must travel because depending on that we have to design the kind of plunger for the pig and then we have other information like if there are any bend.

And if there any bends then what is the angle of the bend, the radius of the bend, and then there in elevation profile whether the pipeline is straight or it is elevated and then the when we use different types of valves, then what kind of valves are there because the pig generally cannot pass to the valve and we need to also protect the valves when the pegging operation operation is going on.

So, we have to look into all this to figure out the what kind of pigs we are going to help and branch connections become often we have a networking of pipeline in the plants. So, we have to see that what kind of networking or the branchings are there in the pipeline and the branching to determine the efficacy with which a peak can travel through the pipelines and then to know that what is the optimum pigging frequency.
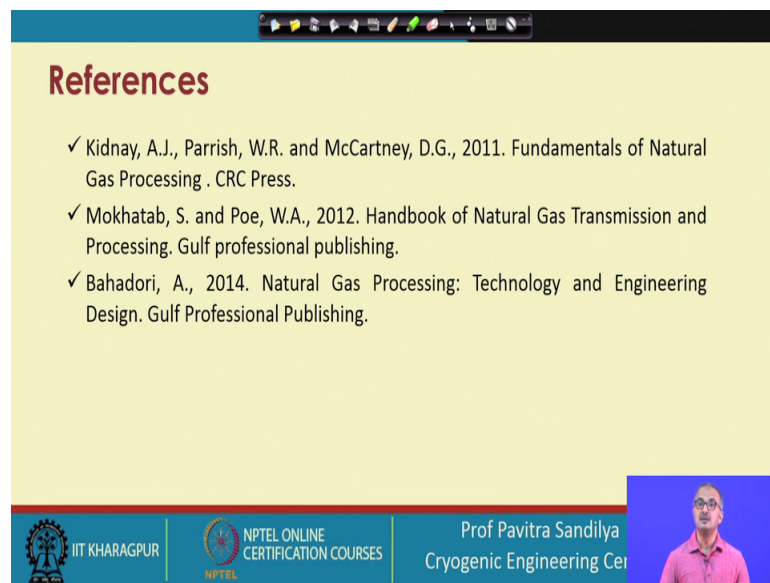
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See pigs are not always there in the pipeline they are coming only when we need to do some kind of maintenance operation. So, it is important for us to know that how frequently we need to perform the pigging action that was the frequency of the pigging.

So, how to decide the optimum pigging? So, in this what we do that if you do too many of this pigging, then what will happen? It will definitely increase our production because pigging means we have to shut down the plant for some time and that will delay our production. So, we cannot have too many pigging.

And then what will happen that if we shut down the production? It is going to raise our expenses of operation. So, we have to figure out that what is the optimum frequency of the pigging. But on the other hand if we prolong the time period between two consecutive piggings that could mean that we will be reading to some kind of pipeline blockages or if there any kind of leakages occurring is a pipeline it will be get delayed to detect those kind of leakages and in that fashion we shall be losing some valuable and not only valuable sometime some very harmful fluids from the system.

So, that is how we have to see to it that we are not doing the pigging to in frequently also. So, we have to figure out what is the optimum pigging frequency. And generally this kind of pigging frequency is found out by some kind of thumb rule that are gathered from the experience of the operators and (Refer Time: 10:36) when there are thumb rules then there will be some kind of uncertainty involved, but that is how so far the industries are deciding the optimum pigging frequency.

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And these are some of the references which you may refer to know the more details about the pigging operation.

Thank you.