Introduction to Lean Construction
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How to Start Practicing Lean Tools in Project Sites-1
Work Sampling

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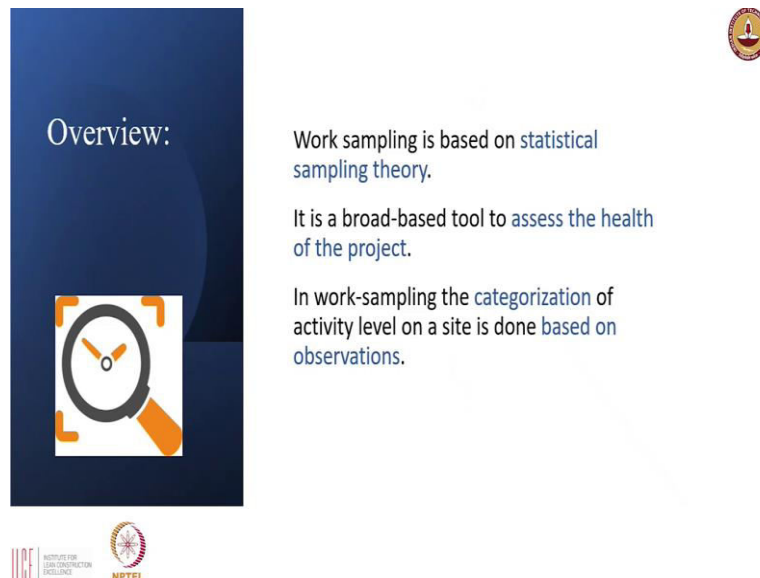
Hello everyone, today I will take you through a case study done by Godrej construction on the lean tool work sampling, I am Diamond Barretto and I have been very much a part of Godrej's lean construction journey.

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So, an overview on what is work sampling? Work sampling is based on a statistical sampling theory, it is broad based and it is used to assess what is the health of the project. So, work
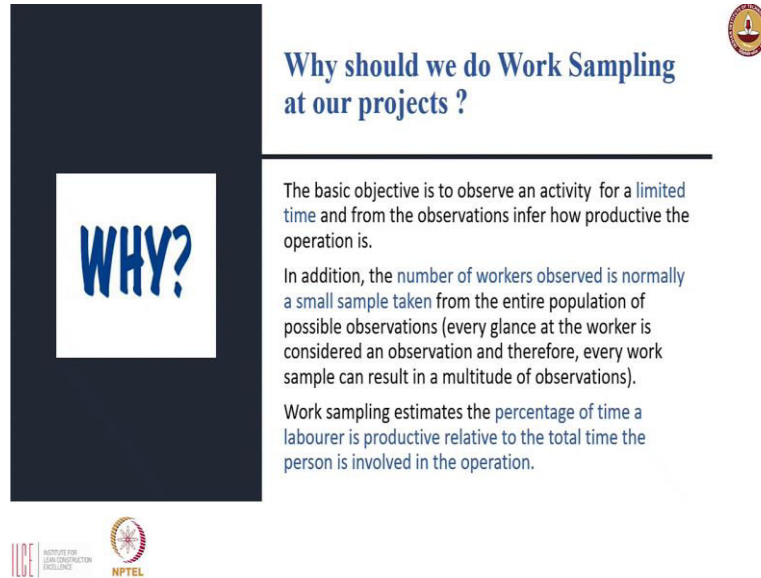
sampling means categorization of activity level items, which are at a site based on a number of observations.

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So, why should we do work sampling at our projects? So, we should do work sampling because we can observe an activity for a limited time from the observations and infer how productive the operation is or activity is. In addition, you have to take a small sample of workers from the entire population and every class at a worker is therefore, considered as an observation and therefore, every work sample can result in a multitude of observations.

So, works sampling basically it estimates the percentage of time a labourer is productive relative to the total time the person is involved in the operation. So, the basic principle of work sampling is that based on the presumption that if a sample is taken from a large group, all the characteristics of the group will be a representative of the group, some or all of the characteristics.

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So, how we go about doing work sampling the procedure. So, we classify the workers activity in any one of these three modes of activity that is, whether it is can be considered as value added work, non-value adding but necessary work that is supporting the main activity and non-value adding work. So, we write them as VA, NVAN and NVA. Then we develop a data collection form that will facilitate telling the observations on site which I will show later.

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Also we take in the third stage random observations of workers involved in a given activity in the field. So, once you record in the fourth stage, all the observations on the form you enter a checkmark under the appropriate mode of activity observed, add up all the checkmarks under

each category and calculate the percentage of the activity which you will understand when I explained the case study.

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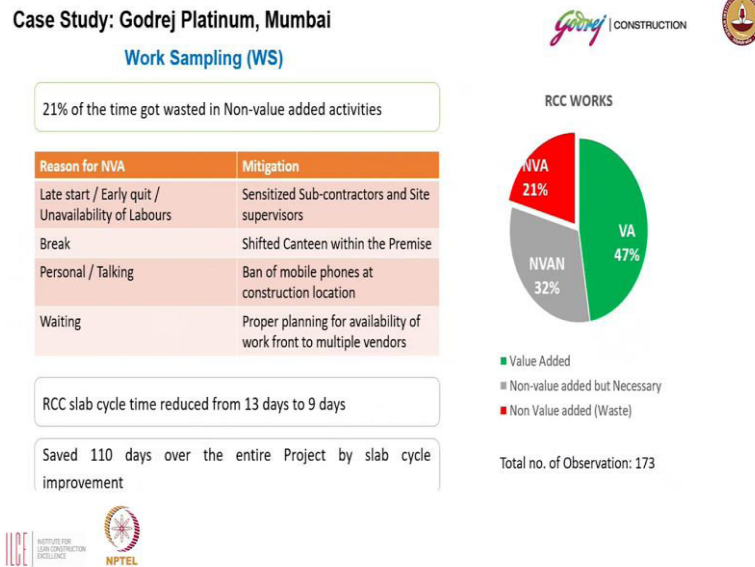
So, first thing we did is we targeted RCC works. So, when we did work sampling, we found that the value added activities we are getting is around a percentage is 47, non-value adding activities are 21 percent and non-value adding activities but necessary activities are 32 percent. Now, value adding activities and non-value adding activities which are necessary, these we cannot reduce because they are a main part of the process, but definitely we can reduce the non-value adding activities which are 21 percent.

So, what we did, we further broke down this activities, which I will show in the next slide. And we understood that they comprise of late start early quit, unavailability of labour, taking breaks personal or doing personal work talking, waiting. So, then we found what are the mitigation measures, like for late start early quit, we sensitise the subcontractors and site supervisors to ensure that this does not happen.

Break time was a long time where they used to take nearly one hour, just to go to the canteen and come back, it was a distance away from the project. So, what we did is we made a small canteen within the project. So, it was easy for them to take a tea break and come back. Also talking of on the mobile phone continuously was causing delays. So, what we banned use of mobile work, mobile phones when they were working, because it was also leading to negligence on safety and other care which should be taken.

So, the fourth thing which was we targeted was waiting time. So, this was because of improper planning and non-availability of work front because multiple vendors were working in the same space. So, this helped RCC slab cycle time which was originally 13 days we could reduce it to around 9 days. And it saved 110 days over the entire project just by this lab cycle improvement and the number of observations we took around 173.

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So, an example of what were the value adding activities which example for RCC we were using MIVAN formwork. So, fixing reinforcements, supporting, staging, concreting this can be considered as value adding.

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Non-value adding NVAN for RCC is like vibration cleaning of formwork, oiling of formwork, all these activities need to be done. But they can be considered as non-value added but necessary.

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And then completely non-value adding activities like which I explained earlier were waiting for material, talking, late start early quit, et cetera some snaps of our project.

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The second we did was on gypsum, which is also considered one of our key activities in finishing. So, our sheet looks something like this every month we were taking observations and categorising various activities as we value adding, non-value added, but necessary and non-value adding. So, all observations which were taken were put in a sheet like this based on

that used to do that totalling tallying and then ways to find out what is the percentage of various, in the various modes of operation.

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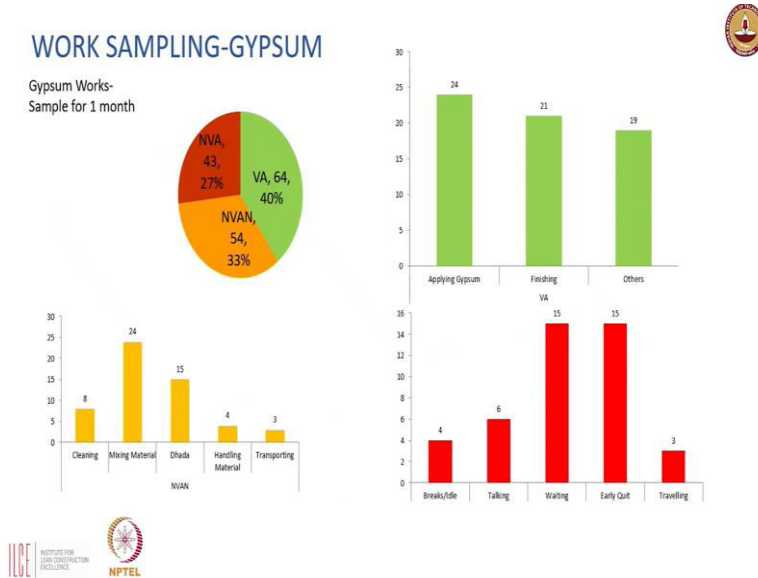
So, these were the results, which we found similar to what I explained last time. So, similarly, we targeted the NVA because VA and NVAN are a key activities for the main process. So, we cannot reduce those, but we can reduce non-value adding activities so, this is how it is.

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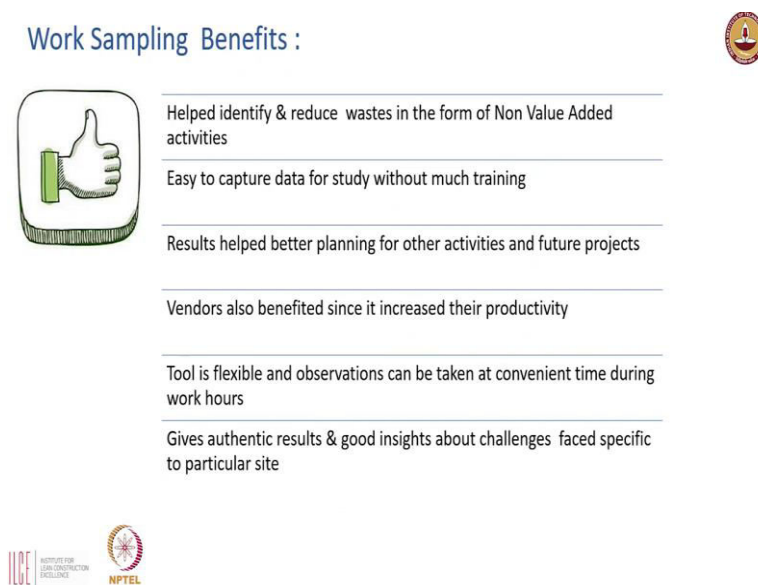
So, what did work sampling help us to do? So, work sampling helped us to identify and reduce the wastes, which were in the form of non-value adding activities. Also we could capture data for study and we could do this without giving much training to the people who

are taking this observations, they were junior engineers or supervisors, and they could do this very easily, in teams of two days to go and take observations every day.

Also this results helped us for better planning of other activities, because when you are at finishing stage, the same non-value adding activities are there in other activities as well. So, if you address this non-value added activity, it will help across other activities. And this sort of study is very important for future projects as well. Also the vendors were very happy with this study, because it benefited them and increase their productivity.

The best thing about this tool it is flexible and you can take observations at time convenient to you during your work hours, it may not be at a particular, you do not have to be very particular that you go at the same time, you know, same within the same hour or same minute more or less here and there it is flexible. Also it gives you very authentic results and good insights about challenges which need to be addressed specific to that particular project.

Because the same results you might not want to get in one project you might not get it another project, the wastes which are created in one project might not at all be relevant or do not need to be targeted at another project. So, this is very project specific, and it helps you gives you very good insights which nowhere you will get and addressing this will benefit in a long way, like it will help you to improve your productivity levels.

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Some of the challenges I would not call them disadvantages, they are more like challenges, because this tool we feel felt cannot be used for all sorts of activities, specially activities which have short duration or activities which are well on schedule and there is no delay in

then, there is no need to use work sampling. Also the chances, a second point a challenge is that the chances of data being wrongly captured is there because sometimes once the workmen get accustomed to people coming and observing them, they change their behaviour.

So, you might be seeing them doing the this non-value adding activities which you are identifying over the next few observations you might find when people stop talking on mobile when they see you or start working when they see you so, all you have to be very careful when taking this observation at that time because they become very alert. Also need committed efforts of the resources deployed for this study.

So, and also resource and time intensive, work sampling is very resource and time intensive. So, it might not be possible very have a shortage of supervisors engineers, to carry this sort of a study. So, and then finally, what I felt was one of the challenges that the construction team and labour changes and then whatever readings you get, it might be totally you know, different across various contractors as well or various teams.

So, then you have to look at it in totality, and use your judgement, what you get, you to based? What to infer from the data which I have analysed and the results which are coming out. So, it was very nice explaining this work sampling tool to you. I hope based on this, what I have told you think there is merit in deploying this tool at your worksite and 100 percent it will help you reduce waste to a large extent. And thank you everyone for listening to me and all the best to you on your lean implementation journey. Thank you very much.