

Introduction to Lean Construction
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Module-1

Sampling/Surveying Techniques -Data Sources in Construction

A good day to everyone. So, we are here today to cover this module on work sampling. We normally cover work sampling in several sessions, but we are kind of condensing the basic concepts to a single session for this course. It gives you the basics and it also gives you supplementary readings to do more details if that is required.

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Session 05 – Sampling/ Survey Techniques

TOPICS

1. Data Sources in Construction
2. Observation/Sampling - Concepts
3. Work Sampling Process & Results
4. Sampling Results -> **Waste** -> Productivity
5. Topics in **Supplementary Module**

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graph TD; DS[Data Sources] --- O[Observation]; O --- S[Sampling]; O --- WS[WS Process for Construction]; WS --- AL[Activity Level]; AL --- W[Waste]; W --- P[Productivity];
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Introduction to Lean Construction: Module 1 – Lean Basics – Session 05 – Sampling/ Survey Techniques

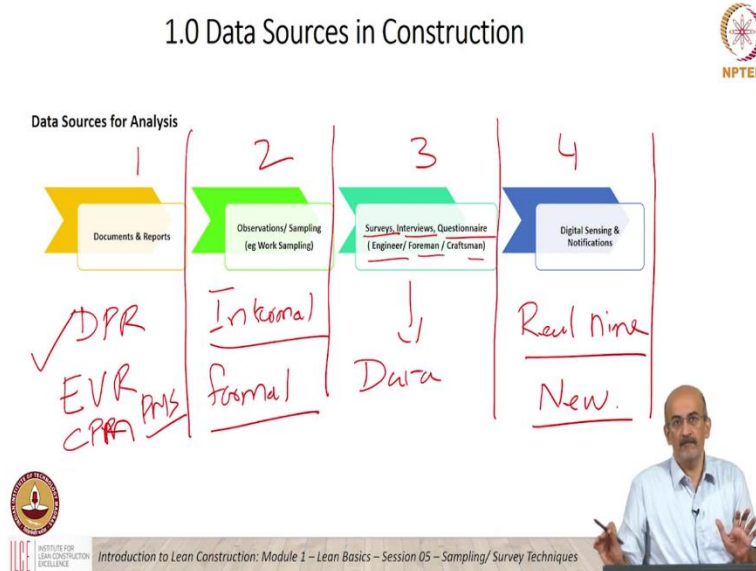
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So, these are the topics that we are going to cover. We will look at data sources and construction. A little bit on observation and sampling as a source of data, as you can see here. We will look at sampling as a source of data, and sampling as a part of observation, which you can see here. So, the data sources, one of the key data sources is observation. There are other types of data sources, which we are not covering, which we will mention a little bit later.

Now, we look at the work sampling process for construction, which is that observation-based process. And what does work sampling do? It basically looks at the activity levels on a site and through these activity levels, what we try to do is assess the waste. Which is very important concept of lean construction. And ultimately, we look at whether waste leads to productivity. So,

this is the basic concepts which we are going to cover in this module. And if like I mentioned, the amount of concepts and techniques covered here is only the very, very elementary part. There are a lot more details given in the supplementary modules for reference.

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Now, let us go to data sources and construction. So, if we look at a construction site and I need to understand or analyze what is happening in a construction site, there are different sources I can get information or data from. So, we have listed the classic sources here. Number one is documents and reports, two is observation-based reports, three is surveys and four which is kind of a novel approach or a new approach today is digital. Now, if I take documents and reports, can someone give me an example of what is typically a document or a report from a construction site?

Student: DPR

Professor: Okay, good. A daily progress report is a document or report, which is actually documented on the site. And if I go to a DPR, I can get data to analyze and see what is happening on a daily basis. If I take my, for example, my earned value report, it is also a documented approach. My CPM, my Critical Path Method reports, all of these are documents and reports. And what we had covered earlier also, the productivity measurement systems. These

are also a documented way of being able to assess what is the productivity and be able to take, do analysis and take control on this. So, these are approaches which we are all familiar with.

Now, what about observation? Do we use, do we do observe, use observation as a method for data collection onsite today?

Student: yes

Professor: How do we use observation?

Student: Supervisors.

Professor: Yes. So, definitely there is an informal way in which we use observation. A supervisor watches over the crew, or today we have webcams on site. Somebody is looking at a webcam. There is definitely observation being done. But in a very, very large context, it is informal. Now, we have heard about the term Gemba with respect to lean, which means, walk the site.

So, a project manager or a planning engineer or a supervisor walking the site is to observe firsthand what is happening. And based on those observations, some conclusion is made. And most of the time, it is informal. Because I am just making an impression or making a judgment based on what I am seeing. One of the core aspects of this lecture is how can you formalize it? How can I get observation-based data in a formal form.

Now, we would not call daily progress report informal, it is formal data in a valid formal form. Can I get similar data from observation? That will be the core of what we are doing to do today. Now, similarly there are surveys, interviews, or questionnaires also that is possible on site to get data. Any, are you familiar with any of this?

Student: Foreman delay survey.

Professor: Yes. There is something called a form and delay survey. Yes, if so instead of actually either going to a documented report or going by based on observation, I might go onto site. I might interview the site engineer, I might interview the foreman, I might interview the workers, I may do actually a questionnaire survey of them which is more formally documented. And from all this, I get mostly secondhand information on what is happening. So, observation might be

firsthand. This is also possible as again kind of any of these can be used. I can use surveys, I can use interviews or I can use questionnaires. I can interview any people on the site and then again, I can get this is also data for analysis.

Now, instead of looking at waste from a observation point of view, I might ask the foreman, what level of waste do you think there is? And the person is sensitive to the amount of waste or lost time as we call it there, he would might be, he or she might be able to give me some answer, which becomes data for me. So, that is another way of getting data.

And the fourth aspect which is now becoming more popular is sensing and notifications. There are sensors on the sites, there are RFIDs. In some ways, this is like a formal documentational and report, but in many ways, it is much more than that, because these are almost, what do you call it? It is on all the time. The minute the material gets delivered, I know, I get an SMS or a message that is saying material is delivered within minutes something goes it is almost like your Swiggy or other apps today, you know where the person is, it is almost real-time information. So, this is almost real time. Whereas our documents and reports are periodic.

So, we are going to an information level today where we can get our, through digital sensing, we can get, but this is kind of, I would say very new and we have not systematized these. But these are the typical data sources in construction today. Are there any overall questions? Any doubts or any aspects which you want to look at.

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Quiz



1. Match the following: Approach and data sources

- I. Daily Progress Report (DPR) – (i) Surveys and interviews
- II. Foreman Delay Survey (FDS) - (ii) Observations
- III. Work Sampling (WS) - (iii) Documents and Reports

- a) I – i, II – ii, III - iii
- b) I – iii, II – ii, III – i
- c) I – iii, II – i, III - ii
- d) I – ii, II – iii, III - i

c) I – iii, II – i, III - ii

