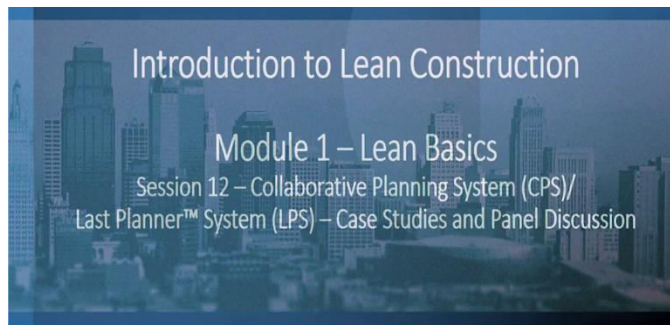


Introduction to Lean Construction
Professor. N Raghavan
Department of Civil Engineering
Indian Institute of Technology, Madras
Module - 01

Understand the Applications of CPS/LPS through Case Studies

(Refer Slide Time: 00:21)



Prof. N Raghavan, FNAE, FICE(UK), FIE(I) and Prof. Koshy Varghese
Department of Civil Engineering
Indian Institute of Technology Madras



Hello everyone. So far we were looking at CPS as a basic process and we looked at the explanations, how to practice it and so on. In this session, we will look at some of the Case Studies.

(Refer Slide Time: 00:35)

Session 12 – CPS/ LPS – Case Studies and Panel Discussion

CPS



Topics to be Covered


- [S12.01](#): Understand the Applications of CPS/LPS through Case Studies
- [S12.02](#): Understand the Barriers and Enablers of CPS/LPS implementation in Construction Projects through a Panel of Academic and Industry Experts
- [Supplementary Module](#)



So, the main intention in this session is to present to you some case studies, how different organizations have been practicing CPS? And then we will have a Panel Discussion between people in the industry and the academia to discuss what are the common enablers and what are the barriers for practicing CPS and what is the overall process?

(Refer Slide Time: 01:05)

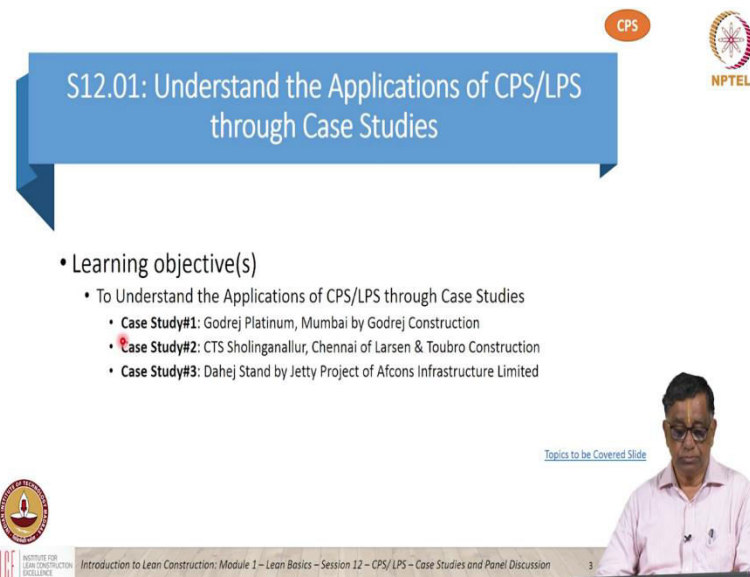
CPS



S12.01: Understand the Applications of CPS/LPS through Case Studies

- Learning objective(s)
 - To Understand the Applications of CPS/LPS through Case Studies
 - **Case Study#1:** Godrej Platinum, Mumbai by Godrej Construction
 - **Case Study#2:** CTS Sholinganallur, Chennai of Larsen & Toubro Construction
 - **Case Study#3:** Dahej Stand by Jetty Project of Afcons Infrastructure Limited

Topics to be Covered Slide



So, the first session, we have three Case Studies, one from Godrej Construction, one from Larsen and Toubro Construction, and the third by Afcons Infrastructure.

(Refer Slide Time: 01:17)

1 Case Study#1: Godrej Platinum, Mumbai by Godrej Construction

Involvement of *People*

Godrej Platinum, Godrej & Boyce

- Project Head
Mr. Kaezad Karanjawala
- Project Manager
Mr. Ramesh Bhandarkar
- Lean Coordinator
Mr. Tushar Lahoti, Mr. Prasad Wavikar
- Engineer In Charge
Ms. Diamond, Ms. Sonal, Mr. Giriraj, Mr. Sarath, Ms. Menka, Mr. Ashraf, Mr. Nitin, Mr. Richa, Mr. Ajinkya, Mr. Neville, Mr. Prasad, Mr. Jitendra,

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So, the first one is building called Platinum done by Godrej Construction, as a main developer and promoter, they engage individual contractors, subcontractors for doing the actual construction work. So, Godrej and Boyce is the main client agency, and they are actually practicing lean in their various projects.

So, the first step actually, they said, we need to identify the people and then sending out a circular saying all these people are involved in the project. So, they get a sense of involvement and motivation.

(Refer Slide Time: 01:55)

1 Deployment Strategy

Creating Awareness
1st Level: Engineers
2nd Level: Contractors

Identification of Activities for Last Planner

Constraint Identification and Creation of Look Ahead Plan

Weekly Meeting

Performance Awards

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So, creating awareness, they had the separate meetings, first for the Engineers, and then for the contractors, explaining exactly what is lean, what are the methods and processes, they are going to follow, and you know, the various steps and so on. And of course, the expectations from the on the outcome from the entire exercise. Then they also identify the various activities involved in doing CPS, and various other things like constraint analysis, weekly meeting, performance awards, we will go through all these.

(Refer Slide Time: 02:29)

Awareness Session with Site Team

CPS NPTEL

1

Introduction to Last Planner System to entire team

Brainstorming session to identify activities

Preparation of responsibility matrix

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The first thing, I think part was creating the Awareness. So, they had several meetings with people. Because, the lean planning thing was a new concept to the entire construction team. So, they were initially questioning, why make a change? Would, what do we need to involve introduce lead construction? So, we had to have about three or four initial sessions, to explain to them what exactly is lean, how to practice, what are the advantages, and so on, how to prepare for launching lean in their project site.


(Refer Slide Time: 03:05)

1

Typical Responsibility Matrix

Entrance Lobby	• Prasad/Ajinkya
Cut Off Door	• Ashraf
HVAC	• Ashraf
3 Lifts	• Sarath / Prasad N
Podium & Stilt Tiling	• Nitin
Signage's	• Ashraf
BMS	• Ashraf
SWHS	• Ashraf
Façade Access System	• Prasad
Terrace Water Proofing	• Nitin
External/Internal Painting	• Ajinkya
Car Park Flooring	• Nitin



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So, then what they did, actually, they had a responsibility matrix with a large project. So they are divided the project into a number of components and a number of trades, for example, HVAC separately, then, the other signage's. And all these things were made identified. And for each, they identified one person or the same person can do more exercises for introducing and implementing Lean.

(Refer Slide Time: 03:31)

1

Constraints Identification Session



- Constraints Identification session is organized along with team
- Participation from all responsible, engineer in charge
- All constraints listed to execute the activity

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At the head, separate meetings with all the people to identify the constraints, that is very, very important. Constraint analysis has to be done by a cross functional team. Because you know,

only the Civil Engineers, or only the Mechanical Engineers, they do not have a global picture of the entire construction process components, all that. And we need to have the cross functional teams sitting together and discussing identifying the constraints and the remedy measures.

(Refer Slide Time: 04:05)



Typical Constraint Identification Sheet



Constraint Log				Update Date	26-06-2013
Project :	Gadfly Platform / GSE				
Phase :	Wing B1 / Aux Tank				
Responsible Individual	Aakash Torner / Mahesh Harse				
Activity affected by constraint	Constraint Description	Responsible Person (Performer)	End Date for an activity as per Planning Manager	Date promised by Performer	Remark
Refuse of Tender Document	Non availability of "Good For Construction" drawings	Anil Vankar / Kailash Parmar	30th Nov	26th August	Done
	Finalization of Agency	Sonal/RVB/KHK		10th September	Done
Excavation					
	Below Ground Service line running through the planned location of tank	Aakash / Mahesh		5th Oct	
	possibility of Shifting of tank due to existing Site Conditions	RVB / Anil / Aakash		5th Oct	
	Transmission Line	Aakash / Mahesh / Satapan			During Excavation activity
	Public Flange material and location to be decided as per site condition	Aakash / Mahesh		30th Oct	
	Water proofing Contract	Sonal / Aakash			Contract Awarding Pending
	Fabrication of manhole for tank and Trap door for Pump room	Aakash / Mahesh			21 days afloat



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So, once I did that, they made a chart like this, what are the various constraints, who is a person to you know, the responsible person, by what date and then they had a mechanism of reviewing this chart from time to time and then see how it is going, whether the constraints are being resolved properly or not.

(Refer Slide Time: 04:24)



Congruence with Milestone Planning



HANDING OVER						
Statutory Approvals						
A3140	17-Sep-13	Application to CPD	31-Dec-13	01-Jan-14	1	0
A3150	27-Dec-13	Site visit of CPD	01-Jan-14	11-Jan-14	10	0
A3160	06-Jan-14	Obtaining CPD NOC certificate	11-Jan-14	21-Jan-14	10	0
A3170	18-Dec-13	Application to DC	01-Jan-14	02-Jan-14	1	0
A3180	02-Jan-14	Site visit of ACDB authorities	02-Jan-14	17-Jan-14	15	0
A3190	22-Jan-14	Obtaining DC certificate	17-Jan-14	07-Feb-14	20	0
Subtotal	22-Jan-14		31-Dec-13	07-Feb-14	37	0
Final Finish						
A3200	04-Feb-14	Final user internal painting	07-Feb-14	18-Mar-14	40	0
A3240	04-Feb-14	Fixing Electrical fixtures (common area)	07-Feb-14	18-Mar-14	40	0
A3250	22-Feb-14	Fixing Plumbing fixtures	07-Feb-14	08-Mar-14	30	0
A3260	01-Nov-13	Final user polish for doors	27-Dec-13	07-Dec-13	40	0
A3280	13-Dec-13	Final paint coat for tiles	08-Dec-13	19-Jan-14	40	0
A3290	07-Jan-14	Lift installation	30-Dec-13	20-Jan-14	25	0
A3300	23-Mar-14	Cleaning	09-Feb-14	03-Mar-14	40	0
A3310	05-Apr-14	Project Finish-Handing over start	23-Mar-14	23-Mar-14	1	0
Subtotal	06-Apr-14		29-Dec-13	23-Mar-14	140	0
Subtotal	06-Apr-14		29-Dec-13	23-Mar-14	140	0
Subtotal	06-Apr-14		19-May-10	23-Mar-14	1407	1272



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(Refer Slide Time: 05:20)



Weekly Meeting



Review Meeting and Decision on Scope Enhancement



And they had frequent Review Meetings. And wherever the Scope changes changed, again, they had to involve all the people to make sure it had no adverse impact on the overall timeline, because the commitments to the clients were considered to be quite important and sacrosanct.

(Refer Slide Time: 05:41)



Typical Weekly Plan

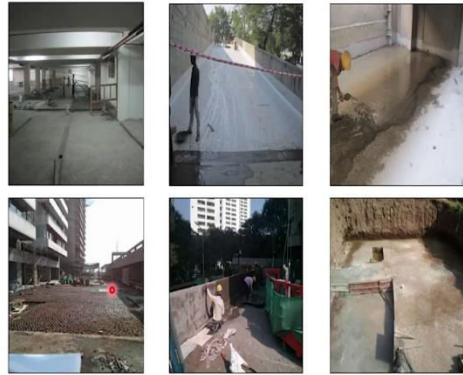


Week 6 : 3rd October 2013 to 9th October 2013		
and		
Week 7 : 10th October 2013 to 16th October 2013		
Sr No	Activity	Responsibility
1	Cut off Doors : Agency finalization	Menka / Jaikumar
2	External Painting : Agency Finalization	Sonal
3	FAS : Deisgn Finalization	Menka / RVB
Week 8 : 17th October 2013 to 23rd October 2013		
Sr No	Activity	Responsibility
1	External Painting : Agency Finalization	Sonal/KHK
2	Car Park Flooring : Agency Finalization	Sonal
3	SWHS : Agency finalization	Menka / Sonal / RVB / KHK





Typical Weekly Site Progress



And again, Typical Weekly Planning, instead of having a chart like that, they also had specific points. And they had photographic records of what they plan and what they were achieved, at which they had to show their management.

(Refer Slide Time: 05:55)



Typical Weekly MoM



No.	Action Item	Owner	Target Date
16	Review the status of the project and the progress of the work.	Project Manager	15th Dec 2015
17	Review the status of the project and the progress of the work.	Project Manager	15th Dec 2015
18	Review the status of the project and the progress of the work.	Project Manager	15th Dec 2015



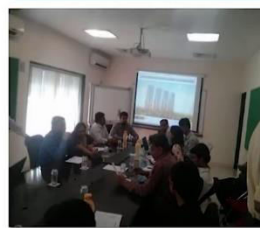
And they had the various line items in the form of minutes of meeting, what was planned, what was achieved, by what date and so on, so the minutes of meeting kind of approach was followed, to make sure that they were staying on course.

(Refer Slide Time: 06:13)



Involvement of Contractor

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2nd Level Awareness Session
conducted for contractors



Project Review Timelines has been
shared with all stakeholders

2nd Level LPS: Sub Contractors Involvement



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17



And then they also involve their contractors and subcontractors, they also were brought on board. Initially, they were very reluctant to come on board to sit in the planning process. They used to keep on saying that, sir, you please tell us what needs to be done, we will do it. But do not ask us to plan.

So, it was the tough process bringing them on board in the Lean process, getting them to sit together, understand what is the constraint, understand what is the root cause. So, all that was done involving them, and that paid a lot of dividends finally, they were also enthusiastic participants finally.

(Refer Slide Time: 06:50)

The slide is titled "Performers of the Month" and features a blue star icon with the number "1" in the top left corner. It contains two side-by-side photographs of a meeting around a long table. Below the photos is a blue box with the text "Motivational Drive for Project Team". In the bottom right corner, there is a video inset of a man in a pink shirt speaking. The slide also includes logos for CPS and NPTEL in the top right, and the IIT Bombay logo and "INSTITUTE FOR LEAN CONSTRUCTION INTELLIGENCE" in the bottom left. The footer text reads "Introduction to Lean Construction: Module 1 – Lean Basics – Session 12 – CPS/LPS – Case Studies and Panel Discussion" and the number "18".

And then they had a good system of rewarding the best players, to the best performer of the month, for example, was chosen and recognized, in front of the other colleagues, that again, was a great morale booster involved, so good competition healthy competition, and by the good idea.

(Refer Slide Time: 07:10)

The slide is titled "Last Planner – Benefits & Challenges" and features a blue star icon with the number "1" in the top left corner. It is divided into two main sections: "Benefits" and "Challenges". The "Benefits" section includes a green checkmark icon and a list: "Reliable Plan – Workflow Reliability and Production Control", "Improved Communication", and "Involvement of Cross Functional Team". The "Challenges" section includes a red question mark icon and a list: "Getting & Identifying Constraints", "Keeping the Commitment", and "Dynamic Planning". In the bottom right corner, there is a video inset of the same man in a pink shirt speaking. The slide also includes logos for CPS and NPTEL in the top right, and the IIT Bombay logo and "INSTITUTE FOR LEAN CONSTRUCTION INTELLIGENCE" in the bottom left. The footer text reads "Introduction to Lean Construction: Module 1 – Lean Basics – Session 12 – CPS/LPS – Case Studies and Panel Discussion" and the number "19".

And they captured, what are the very benefits they got and what are the challenges they had to overcome, and these were actually displayed in charts in number of places in the workplace. So, the people were constantly reminded of what they can achieve by practicing lean successfully. So, all in all, Godrej Construction is still a good practitioner of Lean construction, and they have

derived a lot of benefits. Today, the Chairman of ILCE for example, is the head of Godrej Construction.

(Refer Slide Time: 07:44)

Case Study#2: CTS Sholinganallur, Chennai of Larsen & Toubro Construction

Review Meetings / Minutes of Meeting

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The second case study we have from a Jetty project, sorry, from a building project at Sholinganallur, on OMR in Chennai, for Cognizant Technologies. And this is for Larsen and Toubro Construction. L&T had very traditional strong project management systems, but still they were open to experimenting with Lean.

And this project, they did that and they found that there were many benefits. So, initially, they had a first review meeting, briefing meeting to tell people exactly what is lean, how to practice it and so on. And traditionally, they have a minutes of meeting kind of system, so that they capture the main points discussed, what were the comments coming from people and what action was taken on that.

(Refer Slide Time: 08:37)



PPC data



Progress Updates/PPC Calculations

S.No	Activity	UOM	16 Dec'13 - 21 Dec'13			23 Dec'13 - 28 Dec'13			30 Dec'13 - 04 Jan'14			06 Jan'13 - 11 Jan'14			13 Jan'14 - 18 Jan'14		
			Plan	Achieved	Y/N	Plan	Achieved	Y/N	Plan	Achieved	Y/N	Plan	Achieved	Y/N	Plan	Achieved	Y/N
1	Screed	Sqm	1200	1218	Y	1040	1025	Y	1040	1050	Y	1248	1250	Y	1320	1450	Y
2	False ceiling - Grid works	Sqm	1500	1479	N	1250	1250	N	1250	1210	N	1500	1510	Y	1560	1620	Y
3	Partition works	Sqm	120	121	N	100	98	Y	100	111	Y	120	150	Y	150	140	N
4	Painting works	Sqm	150	158	Y	150	145	N	150	151	Y	180	150	N	180	220	Y
5	Cladding works - Toilet	Sqm	180	191	Y	175	190	N	175	190	N	210	180	N	210	240	Y
6	Flooring works - Toilet	Sqm	240	211	N	200	195	N	200	200	Y	240	245	Y	240	173	N
7	Carpet works	Sqm	1440	1421	N	1200	1190	Y	1200	1240	Y	1440	1447	Y	1500	1750	Y
8	Workstation works	Nos	270	277	Y	250	245	Y	250	245	N	300	280	N	330	345	Y
PPC Calculation	No of Activities done			4			4			5			5			6	
	Total No of Activities			8			8			8			8			8	
	PPC %			50%			50%			63%			63%			75%	



IITB

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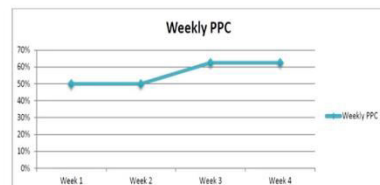
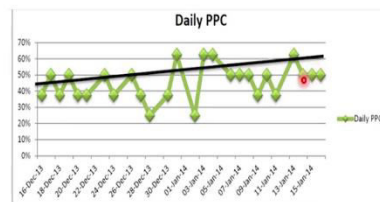


And they developed a PPC chart template in a somewhat different format, they had calculated only weekly PPC, they said they will not track on a daily basis. So they were tracking the performance on a weekly basis. For example, the PPC was ranging from 50 then going up to 75 percent.

(Refer Slide Time: 09:01)



PPC Charts



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(Refer Slide Time: 10:16)



Case Study#3: Dahej Jetty Project of Afcons Infrastructure Limited

Lean Roll Out Programs Carried Out At Site



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Daily Huddle



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Weekly Progress Review Meeting



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26



The third, is very important and very interesting project is a Jetty project in Dahej on the western coast by Afcons Infra, this was a large well spread-out project. So, the office was on land in one place and the entire jetty, people are working at different locations. So, they were not having many times, daily huddle. For example, was done on mobile phones, they all could not come to a single location, because some of them actually were at the Jetty head, which could be accessed only by boats.

So initially, they had a rollout program, involving all the people explain to them what is lean, how to practice it, and so on. And the daily huddle. These, what you see here was at the head of the Jetty in the site office, this was at the other location, this was sometime they had to stand together, and then talk for about 15-20 minutes and so on, depending on the time of the day. And the weekly process, review meeting again to the site office.

(Refer Slide Time: 11:24)



Process Adopted in Implementing CPS



- A few *Lean Training Sessions* were held in the beginning
- Following process was adopted after various course corrections following *monthly reviews* with IITM and Prof. Raghavan's visit:
 - Daily Huddle at 6:00 PM
 - Mid-week Review every Wednesday
 - Weekly Meeting every Saturday
 - Meetings conducted over phone when physical presence is not possible



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27



So, they had a few lean training sessions to get everybody on board in the same wavelength. Then they had the monthly reviews, IIT Madras was the main trainer at the time. And we used to go there frequently, or engage with them on online meetings, and tell them to get how to practice lean, what was going well, what not going well, correct all that.

So, they had a system of daily huddles every day at 6:00 PM. Midweek review on Wednesdays, weekends review on Saturdays, and then whenever not possible to meet in person, they used to have meetings on the phone itself, because the large site, too much spread out who they could not come together all the time.

(Refer Slide Time: 12:12)



Process of Measurement of Metrics



- **Look-Ahead Plan** is prepared for next 4 weeks every Saturday
- **Constraint's Analysis** is carried out every Saturday along with the preparation of look-ahead schedule so that sufficient time of 2 to 3 weeks is available to find solutions to remove these constraints
- A **Detailed Plan (WWP)** for the next week is prepared in this weekly meeting with inputs from all the participants
- **Daily Meeting** is conducted every day to determine and analyze the daily PPC. **Reasons for shortfall** are identified in this daily meeting
- **Root Cause Analysis** is done in the weekly meeting for major activities for which 100% PPC not achieved



So, look ahead plan, they adopted a 4-week planning cycle, then constraint analysis was done every week on Saturdays. And that was very important, they realize a lot of benefits by doing that. And a detailed Weekly Work program again on Saturdays, and daily meeting agenda the day by daily huddle, and root cause analysis again, in the weekly meeting. They are quite systematic, but having their own formats.

(Refer Slide Time: 12:39)



Look Ahead Schedule



Look Ahead Schedule									
Dahaj Stand by Jetty Project									
Date: - 02-Nov-2013									
Sl. No.	Description	Scope	Unit	Duration	Start	Finish	20 Nov 13	27 Nov 13	04 Dec 13
A	Masonry (Enclines 5)								
1	1st layer	352	Cum	1	04-Nov-13	04-Nov-13			
B	Masonry (Enclines 6)								
1	1st layer	188	Cum	1	07-Nov-13	07-Nov-13			
2	2nd layer	188	Cum	1	09-Nov-13	09-Nov-13			
C	Masonry (Enclines 7)								
1	Reinforcement fmg	31	M ²	5	05-Nov-13	12-Nov-13			
2	Formwork fmg	8	M ²	4	05-Nov-13	11-Nov-13			
3	Concrete fmg	339	Cum	1	14-Nov-13	14-Nov-13			
4	1st layer	188	Cum	1	18-Nov-13	18-Nov-13			
5	2nd layer	1	1	1	28-Oct-13	28-Oct-13			
D	Masonry (Enclines 8)								
1	Form	4	M ²	2	04-Nov-13	08-Nov-13			
2	1st layer	31	M ²	3	04-Nov-13	06-Nov-13			
3	2nd layer	31	M ²	3	05-Nov-13	07-Nov-13			
4	3rd layer	31	M ²	3	05-Nov-13	07-Nov-13			
E	Reinforcement for slab piling								
1	1st layer	4	M ²	1	05-Nov-13	08-Nov-13			
2	2nd layer	4	M ²	1	05-Nov-13	08-Nov-13			
3	3rd layer	4	M ²	1	05-Nov-13	08-Nov-13			
4	4th layer	4	M ²	1	05-Nov-13	08-Nov-13			
F	Formwork for slab piling								
1	1st layer	18	M ²	1	05-Nov-13	10-Nov-13			
2	2nd layer	18	M ²	1	05-Nov-13	10-Nov-13			
3	3rd layer	18	M ²	1	05-Nov-13	10-Nov-13			
4	4th layer	18	M ²	1	05-Nov-13	10-Nov-13			
G	Formwork for slab piling								
1	1st layer	18	M ²	1	05-Nov-13	10-Nov-13			
2	2nd layer	18	M ²	1	05-Nov-13	10-Nov-13			
3	3rd layer	18	M ²	1	05-Nov-13	10-Nov-13			
4	4th layer	18	M ²	1	05-Nov-13	10-Nov-13			



So, this is the typical look ahead schedule, what they made, including a bar chart like that, and a weekly work plan Monday through Saturday, and working on the PPC that way.

(Refer Slide Time: 12:52)



Constraint Analysis Table

CPS



Dahej Stand By Jetty Project						
Date: 02-Nov-2013						
Constraint Table						
Sl.No	Activity	Identified Constraint	Remedial Action	Person Responsible	Time by when the constraint will be removed	Remark / Update
Meeting Dahej 3						
1	Concreting	Shortage of material at Floating Batching plant for concreting	Concrete material to be loaded in advance	Mr. Subhash Gite	before 02-Nov-13	
Meeting Dahej 4						
1	Concreting	Shortage of material at Floating Batching plant for concreting	Concrete material to be loaded in advance	Mr. Subhash Gite	before 04-Nov-2013 and 08-Nov-2013	
Meeting Dahej 7						
1	Reinforcement Tying	Shifting of reinforcement form cutting bending yard to required location	Shifting will be done two days before required date	Mr. Chavin	Up to 04-Nov-2013	
2	Concreting	Shortage of material at Floating Batching plant for concreting	Concrete material to be loaded in advance	Mr. Subhash Gite	before 13-Nov-2013 and 15-Nov-2013	
Meeting Dahej 8						
1	Piling	Guide repair during piling	Extra rollers and other parts are kept ready at Jackup	Mr. Ratan Salunke and Mr. Imran David (SPE Engineer)		Extra rollers kept at location
2	Pile bracing	Shifting of bracing to location	Bracing are shifted in advance before starting pile driving	Mr. Ratan Salunke	before starting of pile driving of each pile	
3	Stud welding	Stud welding Machine Breakdown	A standby Machine has been kept at Jackup barge	Mr. Rajesh Pai		
4	Slab Pacing	Non Shifting of Precast Slabs	Painting of shifting of Slab is done as per tide levels	Mr. A.H.Khan	07-Nov-13	
5	Wall Panel Pacing	Non Shifting of Precast Wall Panels	Painting of shifting of wall panels is done as per tide levels	Mr. A.H.Khan	07-Nov-13	
6	Reinforcement Tying	Shifting of reinforcement form cutting bending yard to required location	Shifting will be done two days before required date	Mr. Chavin	Up to 10-Nov-2013	
7	Concreting	Shortage of material at Floating Batching plant for concreting	Concrete material to be loaded in advance	Mr. Subhash Gite	before 17-Nov-2013 and 20-Nov-2013	



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31



And the constraint analysis was very much liked by them. So, they look forward to identifying the constraints, how to resolve them, so that they do not get into problem at the last minute.

(Refer Slide Time: 13:04)



Root Cause Analysis

CPS



Project Name: Dahej Stand by Jetty, Akins Infrastructure Limited
Date: 17 November 2013 to 23 November 2013

ROOT CAUSE ANALYSIS						
Sl.No	Activity	Date	Identified Root Cause for below 100% PPC	Remedial Action	Person(s) Responsible	Deadline by when the remedial action will be taken
1	Stud Welding	18-11-2013 and 19-11-2013	stud welding activity hampered due to DG breakdown.	Replacement of radiator	Mr. Divakaran	19-11-2013
			Water leakage in radiator cell			
			cell thickness reduced			
			Due to over heating in radiator cell			
2	Wall panel placing of MD1	20-11-2013	Material barge did not arrived at the location in scheduled time. Sea condition was rough	Material barge arrived in the next tide slag	Mr. Chavin	20 November 2013
3	Reinforcement tying	22-11-2013	Subcontractor manpower shortage	Company labours were engaged	Mr. Chavin	22 November 2013
4	Jackup shifting and Piling activity	23-11-2013	As the piling for MD 2 completed one day earlier MD 3 activity started one day earlier which was not considered in plan. Sea condition of previous day was good like a pond so instead of 2nos, we have driven 3 piles	Immediately after piling jackup was shifted to the location	Mr. Ratan	23 November 2013



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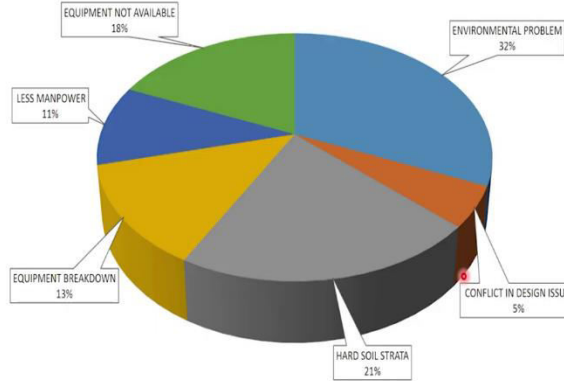
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32





Root Cause Analysis – Pie Chart



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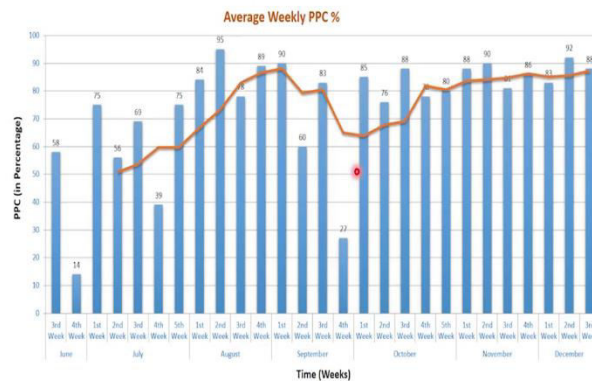


Similarly, with root cause analysis, trying to find out what had gone wrong and remedying that.

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PPC



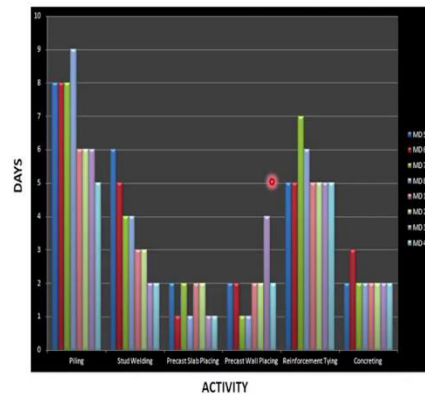
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So, the PPC was increasing quite well monotonic basis more or less.

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3 Cycle Time Reduction for Mooring Dolphin (MD)



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35



And another important concept they had was cycle time analysis. In the Jetty, as well as multistorey buildings, people were looking at cycle time, what are the cycle time from slab to slab for the multistorey building. And here they had a number of different caissons. So, for each case on the different color, they were tracking how they were progressing over time. So, very learning kind of environment.

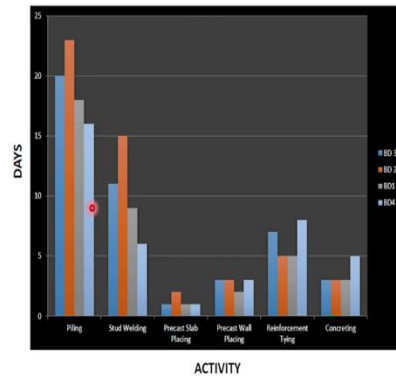
I remember even the labor in their site, were coming up with good solutions. For example, the way the bars were bent, the bars were positioned, rebars in piles, the laborer came up with suggestions on how the pattern can be changed for easy production, improve productivity and for reducing the wastage. So the entire site was actually getting quite enthused, and they were coming up with number of suggestions for continuous improvement.

And overall, today, I must say that Afcons Infra are one of the very forward looking sites, looking organizations for practicing lean, and they have derived a number of benefits. And every time they are coming up with a different solution different format. For example, they are practicing something called choosing by advantages today and coming out with great benefits.

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3 Cycle Time Reduction for Breasting Dolphin (BD)

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36



So, these are all cycle time analysis for the various works from time to time, and they had direct substantial benefits. So, we can go on and on and on with many, many different case studies. And you also can check out in the literature. We had actually for 4 or 5 conferences in India, on lean construction, in every conference there were so many papers and so many posters and all these are explaining how various kinds of, various organizations and projects are practicing lean.

And there are abundant number of case studies available to you in all these conference, literature and proceedings. So, do look at them, see for yourself and formulate your own methods and processes for your site or for your organization, and practice lean well and reap the benefits. All the best. Thank you.

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Quiz



1. Godrej case Study: Which of the following were NOT a part of their CPS practice?

- a) Incentivizing best Performers
- b) 5S
- c) Involvement of Sub-contractor
- d) Look Ahead Plans
- e) Responsibility matrix

b) 5S

2. L&T case study: Which of the following were NOT a part of their practice?

- a) PPC charts
- b) Value Stream Mapping
- c) Root Cause Analysis

b) Value Stream Mapping

3. Dahej Jetty Project: Which of the following were NOT a part of their practice?

- a) Cycle Time Analysis
- b) Constraint Analysis
- c) Work Sampling
- d) 5S

d) 5S



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37

Supplementary Module

Link (to read and contribute)

<https://tinyurl.com/yg555zje>



38