Critical Chain Project Management (CCPM)

Sharing of concepts and deployment strategy

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Objectives

- Why did we implement CCPM at Tata Chemicals?
- Provide an idea of CCPM, its concepts and benefits
- How CCPM was deployed in Tata Chemicals; The benefits we got out of CCPM

Why did we implement CCPM?

A Case for CCPM

- We wanted to speed up the implementation of our Capex projects and realize the project benefits sooner
- Senior management asked us to address this opportunity
- We explored few options and zeroed in on CCPM to pursue this opportunity

An Overview of CCPM

Typical Project Management

- Projects are typically managed based on critical path, the longest sequence of activities in a project to be completed on time for the project to complete on due date
- A couple of assumptions are made here:
  - Resources are available in unlimited quantities
  - Project tasks can be completed on the agreed upon (buffered) time
- However, the reality is otherwise mostly; Projects get delayed even after padding up the tasks (30% to 100%)
- CCPM provides a framework to tackle these uncertainties and yet complete projects on time (and therefore, within budget)

CCPM

- CCPM's main distinguishing features are:
  - Identification and insertion of common buffers
  - Managing resource dependencies, and staggering projects
  - Monitoring project progress and health by tracking the consumption rate of the buffers rather than individual task performance to schedule.
  - And also a couple of hygiene aspects:
    - Do not multitask
    - Ensure you have all resources and info need to perform a task before starting it (a.k.a. full kitting)

Why CCPM? – A recap

- Institutionalized and proven way to manage projects
- Manage triple constraints
  - On time
  - Completion of Scope
  - Within Budget
- Manage project resources well
- Deliver projects quickly so that the opportunity cost is not squandered

Business Benefits of CCPM

Planning Projects in CCPM

- Plan a project by conventional standard

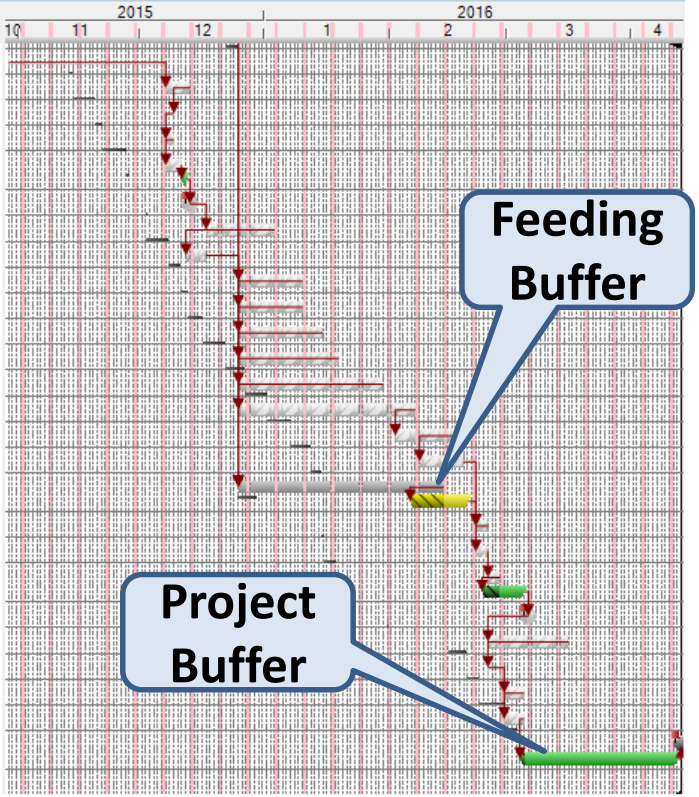
- Typically, the conventional plan will include 30-100% buffer in tasks and will actually look like this:

- After planning, crush the project timeline by 50%, and add the time saved as a common buffer at the end

Planning Projects in CCPM

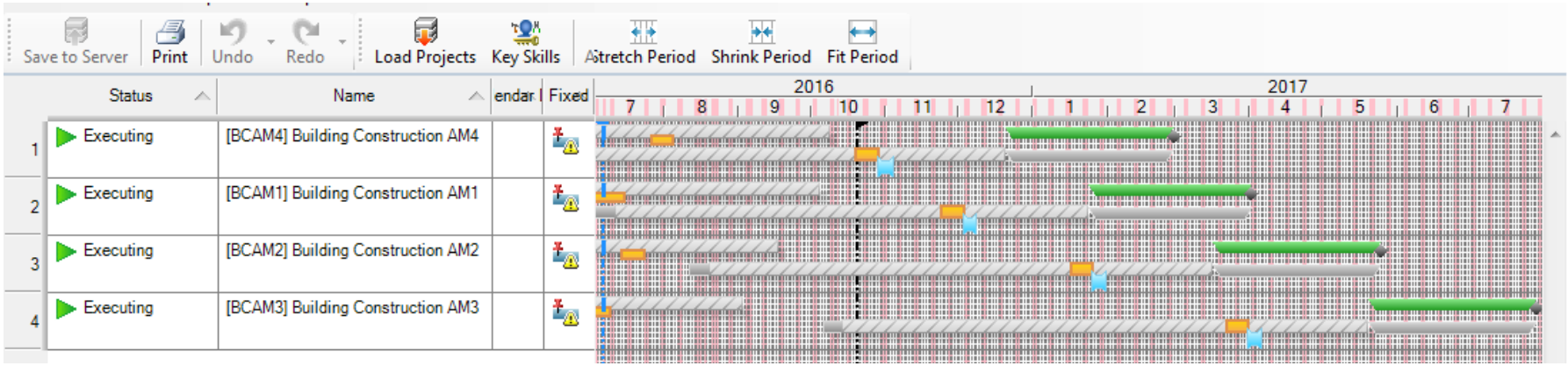
Network Diagram | Gantt Chart | Histogram | Chain View | Assignment View

	Name	Code	ABP	Predecessors	Start Date	Finish Date	Started	Finished	Fixed
32	SCTPL Drawing approval by TCL	32	0		2015-10-28	2015-10-28	Yes	Yes	No
33	Arrival of manpower - SCTPL Cooling Tower Tea	33	6.38	32	2015-12-07	2015-12-12	Yes	Yes	No
34	Inspection & Preparation of Material received from	34	0	33	2015-12-08	2015-12-08	Yes	Yes	No
35	Material receipt of SCTPL material	35	2.09	34	2015-12-07	2015-12-08	Yes	Yes	No
36	CT-5 Shutdown & Isolation	36	4.28	35	2015-12-07	2015-12-10	Yes	Yes	No
37	MILE STONE - 1 START DATE OF STOPPAGE	37	0	36	2015-12-12	2015-12-12	Yes	Yes	Yes
38	Dismantling of total CT	38	15.94	37	2015-12-17	2016-01-02	Yes	Yes	No
39	Removal of Existing - Hot water distribution piping	39	4.19	38	2015-12-12	2015-12-16	Yes	Yes	No
40	Cleaning & checking of RCC cold water basin	40	14.82	39	2015-12-25	2016-01-09	Yes	Yes	No
41	Modification of RCC cold water	41	14.82	40	2015-12-25	2016-01-09	Yes	Yes	No
42	Erection of Timber Structure - Phase 1	42	19.1	41	2015-12-25	2016-01-14	Yes	Yes	No
43	Erection of Timber Structure - Phase 2	43	22.19	42	2015-12-25	2016-01-18	Yes	Yes	No
44	Erection of Timber Structure - Phase 3	44	32.94	43	2015-12-25	2016-01-29	Yes	Yes	No
45	Installation of fan deck	45	40.32	44	2015-12-25	2016-02-06	Yes	Yes	No
46	Installation of fill, eliminator, louvers & end wall ca	46	16.03	45	2016-02-02	2016-02-18	Yes	Yes	No
47	Installation of Mechanical equipment like motor, fa	47	10.66	46	2016-02-08	2016-02-18	Yes	Yes	No
48	Install HOT water piping over fan dack (Vertical H	48	46.68	27, 31	2015-12-25	2016-02-13	Yes	Yes	No
49	Final checking & handover the CT-5 to TCL	49	3.19	47, 48	2016-02-22	2016-02-24	Yes	Yes	No
50	Conduct PSSR & Close findings	50	3.19	49	2016-02-22	2016-02-24	Yes	Yes	No
51	Commission CT-5	51	3.19	50	2016-02-25	2016-02-27	Yes	Yes	No
52	MILE STONE - 2 END DATE OF STOPPAGE	52	0	51	2016-03-05	2016-03-05	Yes	Yes	Yes
53	Conduct performance Trial	53	18.03	52	2016-02-25	2016-03-15	Yes	Yes	No
54	Punch list - Identify & closejob	54	0	53	2016-02-24	2016-02-24	Yes	Yes	No
55	Prepare Hand over documents	55	5.38	54	2016-02-29	2016-03-04	Yes	Yes	No
56	Hand Over the Project with sign off documents	56	5.38	55	2016-02-29	2016-03-04	Yes	Yes	No
57	Goal	57	0	56	2016-04-12	2016-04-12	No	No	Yes



- Projects have overall project buffer and feeding buffers

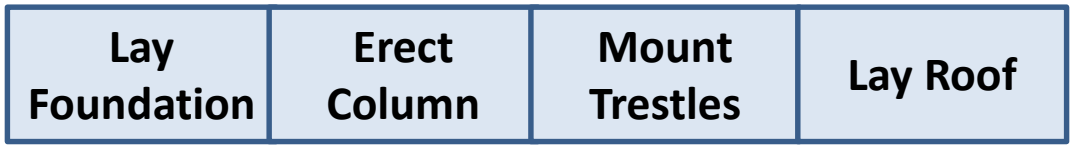
Scheduling Projects in CCPM



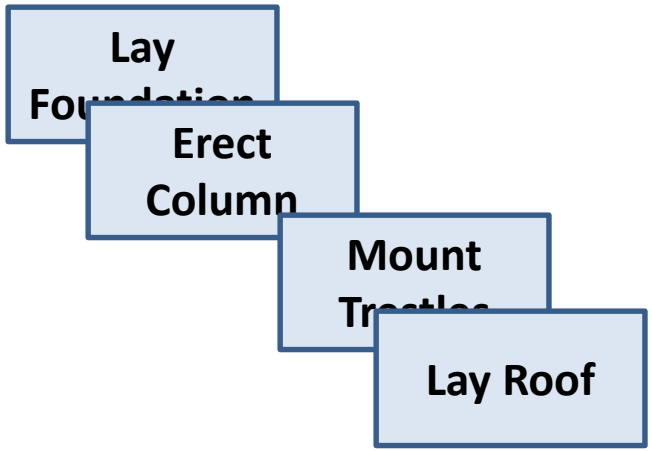
- If you have multiple projects that use a common “constrained” resource, stagger projects so that the constrained resource is not over deployed
- CCPM is arguably the only PM methodology that views projects from such a portfolio standpoint

Scheduling Projects in CCPM

- Reduce transfer batch size:
- For example, a construction project will have the sequence of piling, erecting column, mounting trestles, and laying roof.
- Conventionally, tasks are sequenced as following:

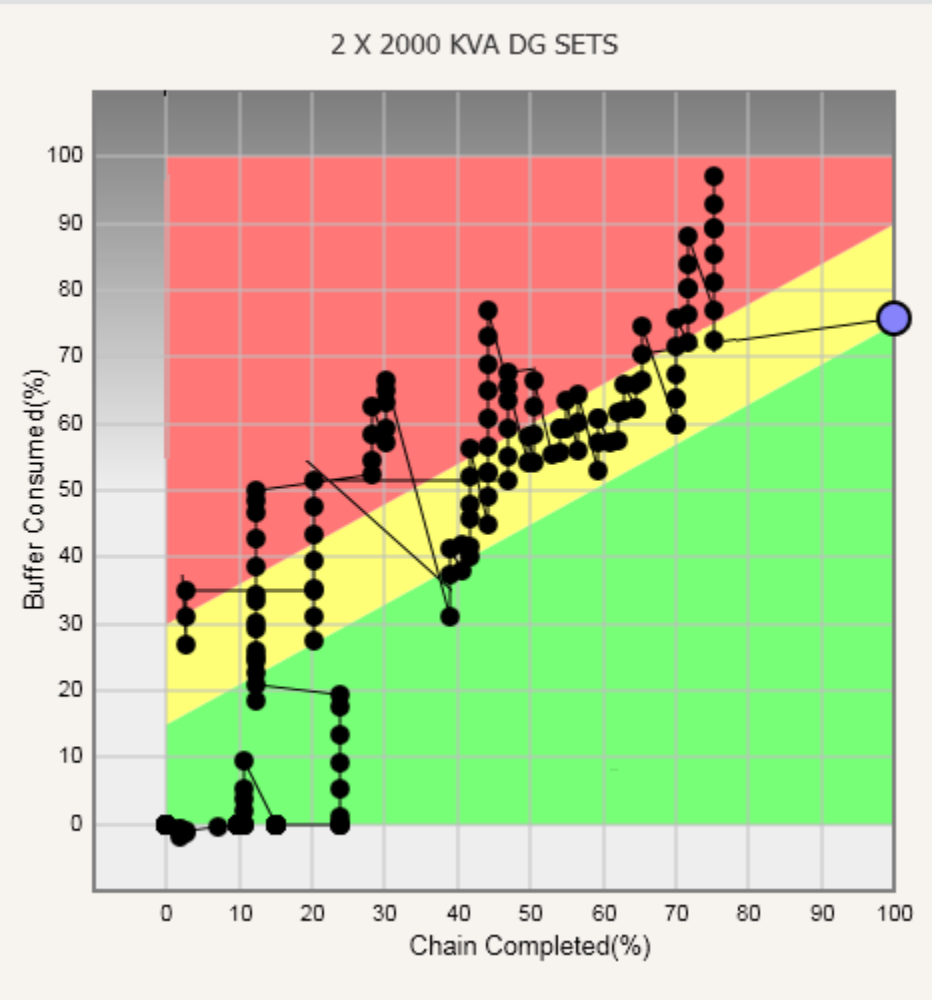


- Alternatively, CCPM suggests the following sequence:



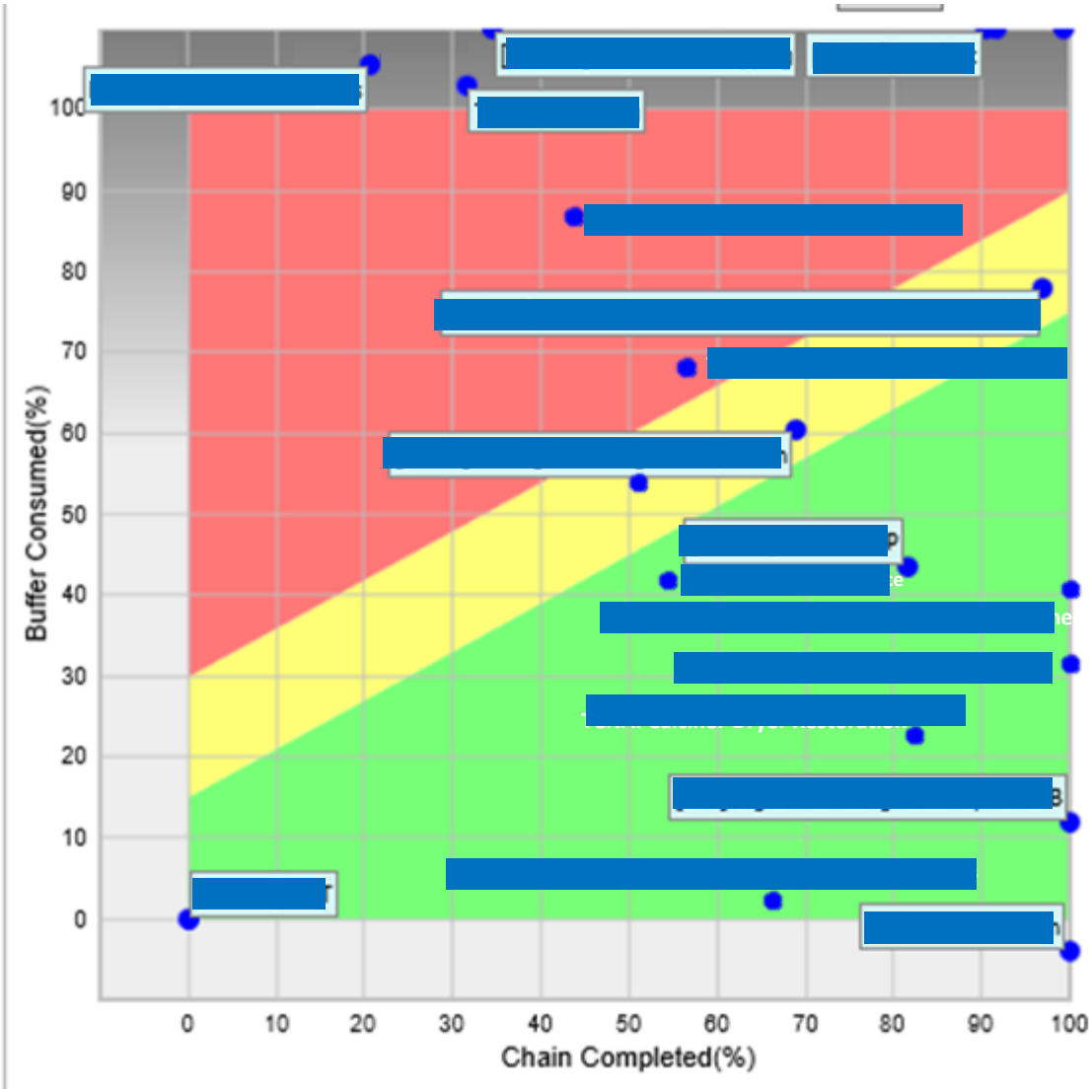
- You don't need to complete the entire foundation to erect columns
- After a few foundation piles, you can start to erect a column

Executing Projects in CCPM



- X-axis: Chain completion
  Y-axis: Buffer consumption
- Look for trend
- When in Green, do nothing
- When in Yellow, create buffer recovery plan
- When in Red, look for added resources (re-allocated from other “Green” projects)

Managing a Portfolio of Projects



- This is how you manage a portfolio of projects
- The health (buffer consumption) of each of the projects is captured
- Resources between projects can be re-deployed to course-correct the laggard projects

Full Kitting

- Often, tasks of a project wait for:

Tasks are Started ….. Stopped …
Re-started ….. Stopped
for want of Full Kit

- Therefore, ensure you have all resources and information prior to starting a task

Why not CPM using MS Project?
Why CCPM using BM3?

- CPM encourages local safeties in task estimations; Local safeties ensure ‘delays are passed on; gains are not’
- CCPM facilitates aggregating the local safeties into Project (or feeding) buffers
- CCPM handles the problem of allocating scarce resources across multiple projects at the same time very well and direct those resources to the projects that require them the most
- The BM3 software reflects the principles of CCPM
- It is easy to learn BM3

Planning a Project

Get the project objectives clear

Project Name:	*Building Construction AM1*
Objectives	*To provide a residential dwelling*
Deliverables	*Residential building as per agreed plan, with all amenities such as electricity, water, and drainage*
Success Criteria	*The owner is given keys to his fully functional and completed unit on or before the committed date*
Requests to Mgmt	*Imported items (elevator, security systems, solar panels, etc.) are to be procured and received without getting held up*
Risks	*Late delivery of 0.5% of the total price for every week of delay. After 20 weeks of delay, the project will start making loss*

Planning – Getting Started

- After capturing the project objectives, think about the last task that will happen prior to the project delivery
- Likewise, keep moving to the ‘last but one’ task, and so on until you reach the first task
- Allow project to branch out as needed
- Let us start doing it practically using post-it notes

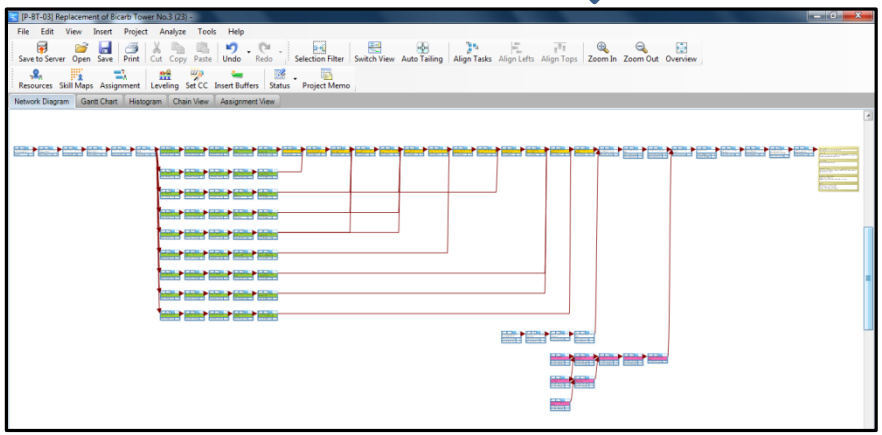
Play planning video – 11 minutes

https://youtu.be/xs_ytOoeL1o

(From 27:01 to 38:00)

Next video episode:

Moving Plan from Paper to Software

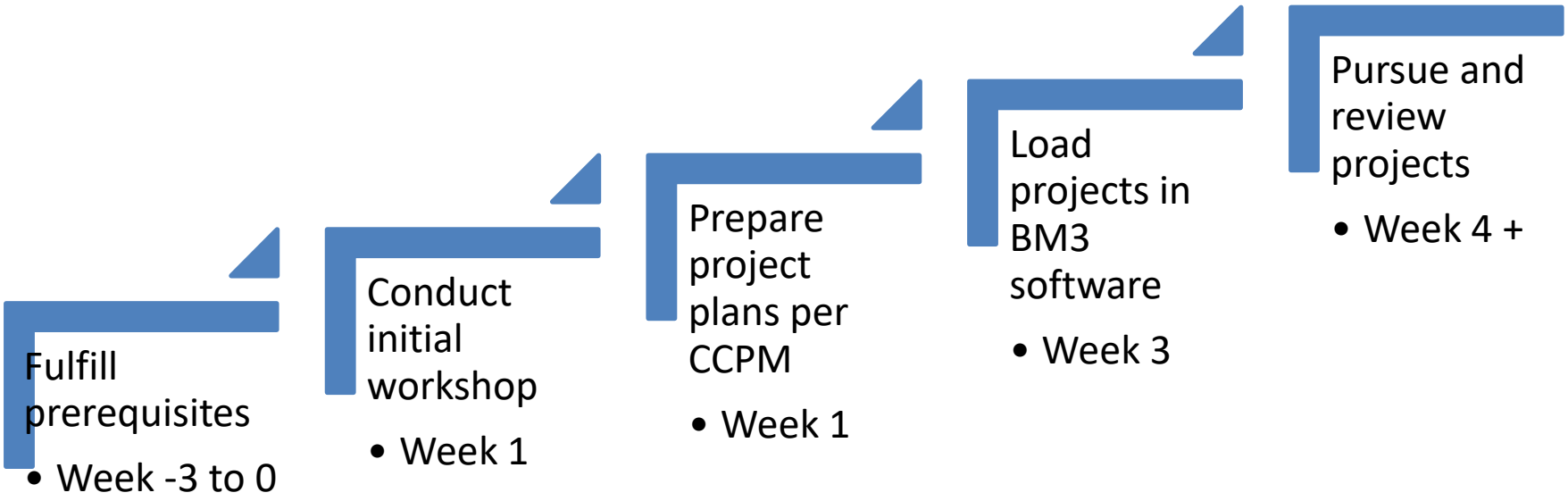


How we implemented CCPM at Tata Chemicals

Pre-deployment

- Visited Tata Steel (a pioneer in CCPM); learnt their practices
- Visited another (non-Tata) MNC, a mature CCPM practitioner
- Identified a good consultant who can take us through the CCPM journey based on our needs and resources
- Developed a deployment plan

Deployment Plan



Prerequisites

- Sought and received the support of senior leaders
- Selected 5 key projects
- Nominated project leaders
- Scheduled a one-week training workshop for CCPM
- Installed BM3 software

Workshops & Projects Planning

- Conducted workshop

Day 1 and 2	Why, What and How to of CCPM
Day 3, 4 and 5	Creating project plan for projects per CCPM

- Came up with a detailed plan in A0 size sheet
- Identified resources for projects
- Entered projects in BM3 software

Projects Pursuit and Review Mechanisms

- Project managers updated their project progress
- Reviewed projects every week with the team
- Reviewed projects every month with the leaders
- All projects leads met once every two months to share experiences & learn

Implementation Challenges Tackled

Challenge	Resolution
Limited resources to spend on consulting and software	Identified affordable consulting and software support, without compromising quality
Resistance for the initiative as it is a new concept that was counter-intuitive to what people normally did	Once internal champion got convinced on the benefits, the rest of the team got on board
Unlearning what they have done in the past as for software	People got comfortable with the new software once they played around with it
Wary of investing more time in planning stage	Realized that it is better to invest 2 to 3 days in planning a 6 to 12 month project, rather than figuring them during the execution

Results

- Over a period of 20 weeks, we deployed CCPM in our major engineering center (Mithapur)

	Pre CCPM (10 projects)	Post CCPM (10 projects)
Due Date performance (DDP%)	30%	90%
Average delay of delayed projects (days)	93	42

- After this success and learning, we implemented CCPM in our North American operations, not just as PM tool, but also as a vehicle to help us run our critical business imperatives
- We also implemented CCPM for our corporate projects & imperatives

CCPM has become not just a project management tool, but an approach to the way we manage business

Knowledge Management

- We created a four part video series which covers
  1. Basic of CCPM and planning https://youtu.be/xs_ytOoeL1o
  2. Planning Projects in CCPM Using BM3 Software: https://youtu.be/h00BODT8qN8
  3. Staggering Scheduling and Resourcing Projects in CCPM: https://youtu.be/m0BEvjkGiic
  4. Executing and Managing Projects in CCPM: https://youtu.be/NsgbtrP6FVM

Who can use CCPM

- Organization that pursues projects, whether in software, service or in manufacturing
- Those who pursue multiple projects at the same time and would like to deploy resources judiciously
- Organization that pursues business imperatives (any imperative is a series of tasks and hence a project)

Thank you