

Research Reports
Articles



Improving flow in large infrastructure projects

by **Vector Consulting Group**



Large infrastructure projects have a dubious record – rarely is a project delivered on or before the original planned due date. Analysis of every failed project reveals that the delays are due to uncertainties; apparently, outside the direct locus of control of managers.

Is it really the case? Are we sure that there are no wastages which are created due to dysfunctional management practices?

The wastage of time and capacity in projects emanate from following erroneous paradigms of management:

Assumption of (In) Adequate Resources

Most of the large infrastructure projects are actually many independent sub-projects, almost executed in parallel with integration at the end. The managerial and technical bandwidth, and even the direct resources (civil labor, fabricators, engineers etc.) required to manage it is significant. But, in most cases, there is always a scarcity of resources. But at the same time, to complete a project on time, it is considered imperative to work on all work fronts sooner rather than later. This in turn leads to bad multi-tasking in engineering and procurement. Delays creep in and almost every sub-project is delayed in the preerection phase. Civil work invariably starts without complete drawings, leading to further interruptions. At the same time, when many civil work fronts are started simultaneously, progress slows down due to thin assignment of resources.



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Almost every manager, in every key area, attributes delays to "inadequate resourcing" and all efforts goes in recruiting experienced or skilled resources, which seem ever elusive. However, what gets ignored is the rampant wastage of limited resources due to multitasking in various support departments leading to inadequate preparations before start of site job or poor issue resolution due to stretched management band-width.

Conflict of cost and time

Large projects invariably involve huge procurement budgets with significant scope for negotiations for price reduction. Typically, use of multiple vendors and aggregation of various parts in different modules (or sub projects) are considered as the best way to reduce costs of bought outs. But at the same time, such aggregations also create a "batching-effect" in design and procurement. This leads to a situation where work has to be done in parallel on all sub-projects at the site. At the end, one reaches a stage where commissioning not only has to be done independently for each sub-project, but also for the larger integration between sub-projects for going live on entire operations. This invariably leads to rework and cascading delays.



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Management by milestones

In such projects, it is considered that a task detailing and scheduling is good for the overall project. Scheduling of minor tasks are usually done up to level 4 and even level 5. This level of detailing in task scheduling leads to buffering, and higher overall lead time. When the task milestones are converted to deadline, it invariably leads to behavior of adding buffers in plans while most of it is wasted in execution. Surprises are revealed only close to milestones, when delays are not recoverable. Issue resolution slows down and blame game becomes rampant and plans are rescheduled to follow execution. Execution drives plans rather than the other way out.



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The way out

The 'Theory of Constraints' way of managing large projects is to first acknowledge the limitations in resourcing and management bandwidth. Once this limitation is accepted, the focus shifts to exploiting the limited bandwidth rather than wasting it by bad-multitasking. So the way ahead is to visualize the large project as portfolio of small subprojects and stagger them considering the limitation in resources. The rules of WIP (work in progress) control are put in design/procurement with clear prioritization of different modules. Work on module is activated not based on a planned start date, but based on a module completed from allowed WIP. The staggering of work fronts in preerection leads to staggered execution in civil.



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The conflict of cost and time is resolved by organizing work for collective simultaneous decision-making. The procurement contracts are designed to get aggregation benefits without having to aggregate and batch work modules.

Similarly, daily management becomes the guiding management mantra rather than milestone management. The buffers are shifted from the tasks and aggregated at the project level to provide maximum safety at a point where it is needed the most.

Vector Consulting Group (www.vectorconsulting.in), is the largest Theory of Constraints (TOC) consulting firm in Asia. The firm has been working closely with well-known companies across industries to help them build unique operations and supply chain capabilities that can be leveraged as a competitive edge in the market. Vector now has the highest number of success stories in Theory of Constraints Consulting and has also won several national and international awards for their work.