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How to Ensure Control Data Consistency in a Large, Complex Project

To keep control of a Large, Complex Project it is essential to put together a picture of the Project both in terms of current status and in terms of end-of-Project forecast. This picture needs to remain consistent at all times between all dimensions of cost, schedule, resource plan etc. This requirement might highlight some discrepancies that need to be addressed quickly to guarantee continuous control of the Project. In this White Paper we explain how to best maintain this data consistency during the course of the Project: it is the role of the Project Control Manager.

Key Consistency Points between Project Controls Processes

The consistency requirement covers naturally the usual Project triangle of cost, schedule and scope (represented in our case by the Main Contract's requirement completed by the Project execution baseline). In addition, the risk process is deeply intertwined with all these three dimensions and it is essential to ensure consistency so as to avoid double-dipping or outright oversight of certain risk components.

The table on the following column summarizes the main consistency best practices between all those four dimensions.

Root Causes of Discrepancies

Supposing that Cost, Schedule, Risk and Scope (Contract) were perfectly consistent at the establishment of the first baseline at Project start-up, any subsequent discrepancy is the result of a change of circumstances. These can roughly be separated based on their origin between:

- Changes due to internal Project causes,
- Changes due to the Owner / Main Contract Client (this includes the interface with other Main Contractors on the same overall Project),
- Changes due to Vendors / Contractors,
- Changes due to other external stakeholders (e.g. regulators, customs, other authorities).

Changes are also generally of two different types.

- Changes due to conscious decisions related to Project execution (change of scope, of supplier, of execution approach etc.),
- Changes due to unexpected productivity issues of the resources used by the Project (which might be intrinsic to a given discipline or due to lack of coordination between disciplines).

The first type of changes should be captured by the relevant Management of Change process and all the other information management processes. The second type of changes is more elusive because it does not result from a decision, it can thus only be observed happening and the resulting consequences established after the relevant activity has started.

Cost & Schedule	• Time-dependent resource costs updated when schedule updated (Project Management, key resources utilization), • Project Cost Model time-phasing consistent with Project schedule, • Cash Flow (revenue receipt minus payments issued) consistent with Project schedule (milestones achievement, or progress-based revenue), • If schedule is resourced, consistency between schedule resource utilization histograms and cost model • Forecast consistent with Actual cost and actual physical progress (Earned Value Management, productivity)
Cost & Scope (Contract)	• All scope comprehensively covered (full WBS coverage), • Approved internal Scope changes, Client or Contractor claims and approved external Change Orders accounted for in Project Cost Model (if possible in separate work packages for tracking purpose), • Cost forecast and quantities consistent (quantity-based forecast) • Sensitivities for submitted but unapproved Change Orders accounted for, • Lump Sum, Rate-based and Reimbursable cost elements clearly split in Project Cost Model.
Cost & Risk	• Cost & Revenue sensitivities consistent with identified Opportunities and Risk register, • Contingency element consistent with Opportunity & Risk register, • No double-dipping between allowances and quantitative risk elements (to be checked at the risk model line level), • Highly probable risk elements taken as deterministic prudent cost forecast, • 'Achievable' margin needs to be better than reported margin (prudency principle).
Schedule & Scope (Contract)	• Approved Scope changes and Change Orders accounted for, in particular regarding new activities and Extensions of Time on key milestones, • Reference to the latest contractually approved schedule baseline • Consistent management of interfaces (in particular, 3rd party supplied / free issued elements)
Schedule & Risk	• Activity durations not padded, clear identification of float and buffers • Contingency calculation takes into account additional cost due to expected additional duration
Scope (Contract) & Risk	• Opportunities and risk linked to future additional or removed scope are taken into account in the risk model, • Liquidated Damages accounted for in the risk model, • Other applicable Incentive / Penalty schemes taken into account in the risk model.

Consistency Management Best Practice

Monthly Project Control alignment meetings

A monthly coordination meeting involving all Project Control disciplines is held at the start of the monthly update cycle, just after the review of the Project Periodic Report by management, to frame the longer term upgrading and forecasting efforts that need to be implemented for the next cycle.

A second coordination meeting is held ten days to one week prior to the issuance of the next Monthly Project Periodic Report, to frame what are the key forecasting activities to perform on the basis of the new data on Project progress. These re-forecasts are typically less wide-ranging due to the limited time available.

Ensuring consistency between the four functions of Project Control (Cost, Schedule, Risk and Contract) is an essential role of the Project Control Manager, who is the only person to have a full overview of these functions' output.

Checking for Consistency in Reports

Project Periodic Reports are documents where consistency between Cost, Schedule, Risk and Contract need to be specifically achieved. Lack of consistency will significantly reduce the credibility of the reports and undermine management confidence that the Project effectively under control.

The Project Control Manager is directly responsible to ensure that this consistency is achieved.

Assessing Consequential Impacts

Consequential impacts need to be addressed adequately in all analysis and decision-making. The Project Control Manager is the only person that can coordinate the assessment of consequential impacts, because of his overview on the Project.

The Project Control Manager must have the tools to identify inter-dependencies and establish what could be the consequential impacts of events reported by individual functions. The main effects are often due to delays propagating through the schedule network.

- Extension of time for Project Management and other fixed time-dependent costs,
- Possible standby of resources (or alternatively, additional mobilization/ demobilization costs),
- Interface issues with stakeholders,
- Additional storage of equipment and material,
- Need for unforeseen or additional preservation,
- Loss of availability windows for key equipment and contractors,
- Loss of seasonal weather windows,
- Contractual issues with vendors, contractors or clients (such as liquidated damages and claims for changes of site availability dates).

Keeping on top of consequential impact is an essential piece of maintaining consistency of the Project Model (Cost, Schedule, Risk and Contract), by proactively modelling and responding to these consequential impacts in advance of their possible effect. In addition it does not make sense to update the Project Model for an event by only considering direct consequences and forgetting about consequential impacts that can be very significantly more onerous.

Conclusion

Ensuring consistency between the four functions of Project Control (Cost, Schedule, Risk and Contract) is an essential role of the Project Control Manager, who is the only person to have a full overview of these functions' output.

Ensuring and reporting consistent data is essential to demonstrate in a credible manner that the Project is effectively under control. Each time some discrepancy is identified the Project Control Manager should raise the issue to those members of the Project Management Team accountable for the relevant areas. Moreover, the Project Control Manager needs to identify and implement data gathering process upgrades if required after a thorough root-cause analysis.

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