

## Integration of the Earned Value Methodology into the Project Management System of Lippert



Figura 2: MI20 Chamfered & Extremity Door Pillars (Île-de-France mobilités illustration)

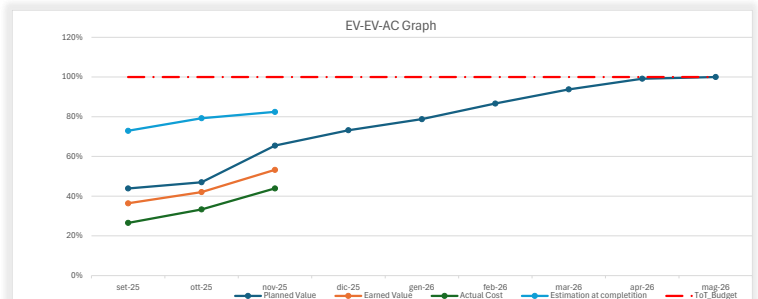


Figura 1: Earned Value Metrics Chart (own illustration)

| Control Account    | PV November 25 | EV November 25 | AC Tot November 25 | Cost Variance November 25 | Schedule Variance November 25 |
|--------------------|----------------|----------------|--------------------|---------------------------|-------------------------------|
| Engineering        | 10,5%          | 11,7%          | 9,3%               | 2,4%                      | 1,2%                          |
| Project Management | 3,1%           | 2,6%           | 0,6%               | 2,0%                      | -0,5%                         |
| Quality            | 0,0%           | 0,0%           | 0,0%               | 0,0%                      | 0,0%                          |
| Tooling            | 51,8%          | 39,8%          | 34,1%              | 4,9%                      | -12,8%                        |
| Total              | 65,5%          | 53,3%          | 43,9%              | 9,3%                      | -12,2%                        |

Figure 3: Earned Value Metrics by Control Account (own illustration)

### Problem Statement

In the railway infrastructure sector, project management is increasingly challenged by the high complexity of projects, the substantial number of deliverables, stringent regulatory requirements, extended timelines, and budget constraints already present during the bidding phase. Lippert already employs project management techniques, yet reporting remains complex and not sufficiently immediate, resulting in analyses being performed at intervals that are too distant. This limits the timeliness and clarity of the updates provided to senior management. Consequently, the monitoring of actual project execution does not always allow for the early identification of critical deviations nor for accurate forecasting of the project's final outcome.

This research addresses this disconnection by introducing a structured model that systematically links the actual progress of activities to the costs incurred, providing an integrated view of the project's status and its overall performance.

### Methodology

The methodology combines a theoretical review of Earned Value Management principles with direct observation of Lippert's current

project practices. Literature analysis and process mapping provide the foundation for identifying integration gaps between cost, schedule, and progress data. Seven interviews with project managers supply practical insights and validate the alignment between theory and practice. Based on this evidence, an iterative design process defines rules for determining percentages of completion, aligns the framework with existing Gantt structures, and integrates it with available economic data. The model is then tested on real case studies to evaluate its feasibility, consistency, ease of use, and suitability for project managers' needs.

### Solution

The solution developed consists of an Excel-based framework designed to coherently integrate the physical progress of activities with the economic and schedule performance of Lippert's projects. The model provides a structured and standardized system that enables project managers to monitor costs, timelines, and progress with greater precision and transparency throughout the entire project lifecycle. The framework introduces uniform rules for determining percentages of completion, reducing variability derived from subjective assessments. The system

automatically processes the main Earned Value indicators, providing an immediate overview of the project's status through SPI, CPI, variances, and final estimates. Since it is not possible to access the hourly consumption of individual activities, the framework redistributes labour costs by weighting them against the Earned Value earned by each activity, ensuring a consistent connection between technical progress and costs incurred. Visual dashboards further support the identification of performance issues and trends. Overall, the framework represents an adaptable system that can be applied to different project types without requiring substantial changes to existing company processes.

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