

PERFORMANCE MEASUREMENT SYSTEMS FOR BENCHMARKING IN THE CONSTRUCTION INDUSTRY

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Why is PMS for benchmarking important for lean construction?

- Dissemination of new operations management ideas
 - The companies can share and discuss their practices and learn from each other
- Information provided should enable a better understanding of the business practices (the company's and its competitors')
 - It encourages the development of improvement actions, instead of being only used for data comparison



Objective

- Raise key issues related to the use of PMS for benchmarking in the construction industry
 - Identify some key factors in the effective design and implementation of such performance measurement systems
 - Identify improvement opportunities in PMS for benchmarking



Performance Measurement for Benchmarking

- Key Performance Indicators (UK)
 - National Benchmarking System for the Chilean Construction Industry (Chile)
 - Construction Industry Institute Benchmarking and Metrics (USA)
 - Performance Measurement System for Brazilian Construction Industry (Brazil)
- The information about these initiatives was obtained in their web sites, from published papers and also from interviews by email.



Design of the Measures

Criteria		KPI (United Kingdom)	CDT (Chile)	CII Benchmarking & Metrics (USA)
Scope of measures	Lagging measures	Client satisfaction* Defects* Predictability cost* Predictability time* Profitability Safety Productivity*	Deviation of Cost by Project* Deviation of Construction Due Date* Change in Amount Contracted Rate of Subcontract Cost Client Complaints Efficiency of Direct Labour Accident Rate* Risk Rate*	Project Cost Growth Project Budget Factor Project Schedule Growth Project Schedule Factor Total Project Duration Change Cost Factor Recordable Incident Rate (RIR) Lost workday Case Incident Rate (LWCIR)
	Leading measures		Effectiveness of Planning Urgent Orders Productivity Performance*	Total Field Rework Factor Phase Cost Factor Phase Cost Growth (owner data only) Phase Duration Factor Construction Phase Duration
Note: * measures that could be used if measured during the process				

Implementation of Measures

Criteria		KPI (UK)	CDT (Chile)	CII Benchmarking & Metrics (USA)
Implementation	Positive issues	Online software for users Benchmarking Club	Online software for users Outlined system (qualitative analysis)	Online software for users Annual training Annual questionnaire to evaluate the companies
	Difficulties	Availability and validity of data Do not offer opportunities for real time control	Commitment of companies Measures Standardisation	Commitment of the companies Implementation of improvement based on the findings

Lessons Learned

Good Practices

- Joint efforts of several agents are necessary
- Programmes do not refer only to data collection
 - Also provide data analysis, training and enable exchange of practices among companies
- On-line tool to collect data and compare performance
- Performance measurement system design must be revised from time to time



Lessons Learned

Improvement opportunities

- Excessive number of measures (KPI)
- Lack of leading indicators
 - Suppliers' Performance
 - Internal Client Satisfaction
 - Good practices in construction sites
 - Quality (process deviations and QMS non-conformities)
- Alignment with the company strategies
- Tools to support the incorporation of the measures in the organizational routine
- Mechanism for data validation



PMS for Benchmarking for Construction in Brazil

→ Started in October 2003

→ 1st Benchmarking Club:




- 19 construction companies in Porto Alegre-RS.
- 6 meetings to discuss and standardise the measures

→ 2nd Benchmarking Club:

- 11 construction companies in Goiânia-GO (it will start in August 2004)



Set of Measures - Brazil

Criteria	Indicator Name	Formulae
Cost	Cost Deviation	$(\text{Actual total project cost} - \text{Initial predicted proj. cost} / \text{Initial predicted project cost}) \times 100$
Time	Time Deviation	$(\text{Actual total project duration} - \text{Initial predicted proj. duration} / \text{Initial predicted project duration}) \times 100$
Plan	PPC (Percentage of Plan Completed)	$(\text{Number of assignments 100\% completed} / \text{Number of planned assignments}) \times 100$
Client and product quality	Degree of External Client Satisfaction (user)	Application of a questionnaire
Client and product quality	Degree of External Client Satisfaction (owner)	Application of a questionnaire
Sales	Average Time for Selling Units	$(\text{Number of units sold per month} / \text{Number of units for sale}) \times 100$
Sales	Contracting Index	$\text{Number of wined contracts} / \text{Number of proposals} \times 100$
 Supply	Supplier performance	Application of a questionnaire
Safety	Ratio between the number of accidents and total man-hour input	$\text{Number of accidents} / \text{Number of working hours} \times 10^6$ (by month)
 Security, health and environment	Construction Site Best Practice Index	$(\text{Number of items complied in the checklist} / \text{Total number of applicable items form the checklist}) \times 10$
Construction product quality	Non-Conformity Index in the unit delivery	$(\text{Number of non-conformities} / \text{Number of checks}) \times 100$
Quality Management System	Non-Conformity Index in the audit	$(\text{Number of non-conformities} / \text{Number of checks}) \times 100$
 People	Degree of Internal Client (Workers) Satisfaction	Application of a questionnaire

Further studies

- Understand the differences between measures and benchmarking systems adopted in different countries, in order to enable international benchmarking
- Develop frameworks that support the migration from performance measurement to performance management systems
- Develop collaborative learning processes
- Devise new (lean) measures
- Develop a theoretical framework for performance management



THANK YOU!!!

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