

TESTADVANCE ENGINEERING- MANAGEMENT SERVICES (TCEM)

This document describes testadvance's
Engineering-Management services and process

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Assessment

Life-Cycle & Analysis

- Further productivity
- Reduce costs
- Further job-satisfaction and motivation
- Reduce Non-Recurrent Engineering, Work In Progress, re-work and 'fire-fighting'
- Increase utilisation of engineering work, learning, knowledge, assets and investments

Improvement Design & Delivery

- Accelerate life-cycles
- Improve ROI/ROA

Testadvance Engineering-Management services help engineers and managers further their work and department by providing an experienced, 'outside view' and sensible and efficient advice.

1 Deliverables

Engineering-Management Document (EMD)

1. Scope of Engagement (SoE/SOW Section 1)
 - o Framework
 - o Targets and entity
 - o Metrics, Benchmarks
2. Scope of Optimisation (SoO/SOW Section 2)
 - o Structural assessment
 - o Life-Cycle Analysis
 - o Performance Report
 - o Areas of Improvement/Opportunity
3. Optimisation Design Specification (ODS)
 - o Immediate measures
 - o Process and entity measures
 - o Opportunistic and ongoing measures
4. Delivery Plan
5. Benchmark and Performance Review

2 Engineering-Management Services Process (TCEMP)

Engineering-Management services use a structured, systems-thinking approach allowing us to quickly and correctly focus on specific areas while maintaining a correct understanding of the overall entity. Simply put, we can focus on what is needed without losing the 'big picture'. The 'operational layer' addresses the interaction with the parent operation. The 'functional layer' addresses the functions, work-structures and work-flows. The 'physical layer' addresses the tasks and elements such as individual resources, skills, procedures, etc. This ensures alignment with the client's needs, objectives and priorities across all 'layers'.

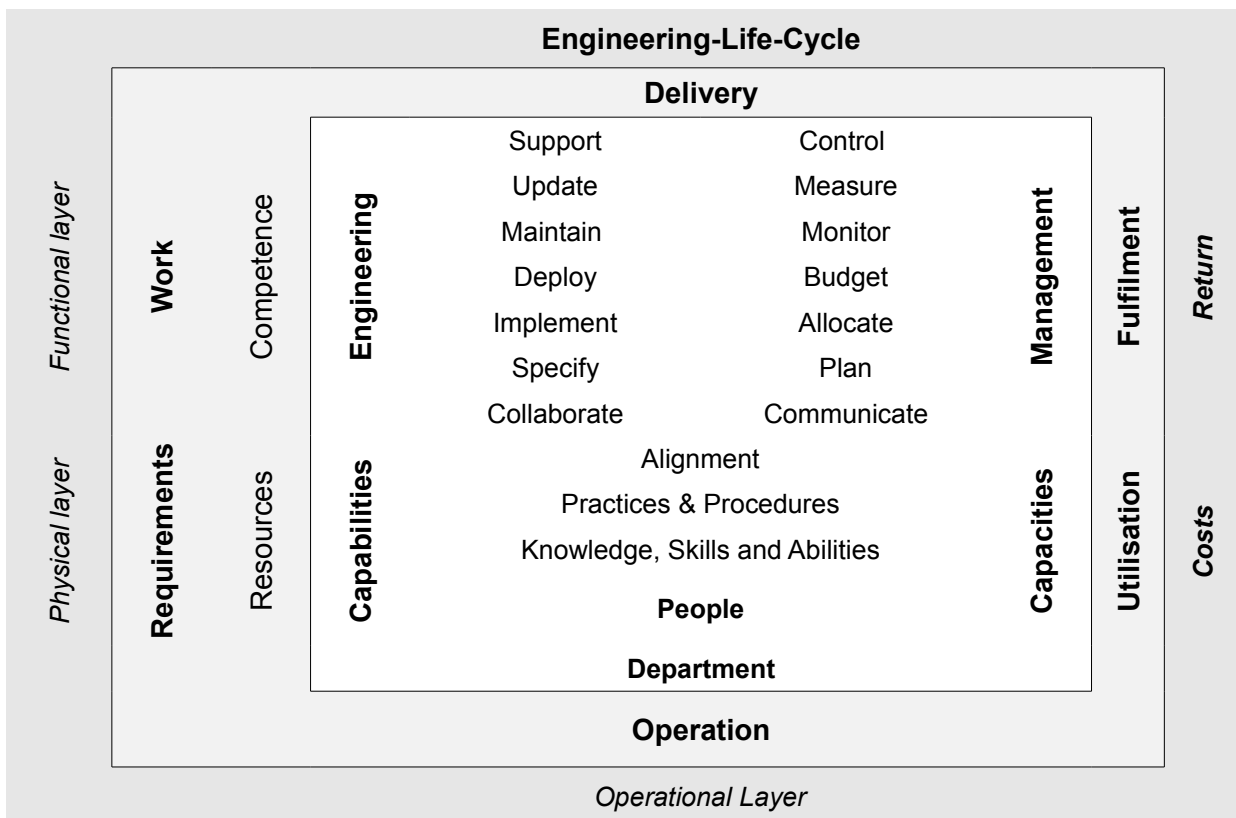


Figure 1 Systems-Approach to Engineering-Management

Engineering is a system made up of smaller sub-systems such as work-structures, teams, projects and functions. Engineering itself is part of the larger system of operations and business. The interactions between systems and sub-systems are defined by the processes and practices used. All tangible and intangible resources and assets across plant, intellectual property and staff are captured in this structure.

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| <ul style="list-style-type: none">i. Assessment<ul style="list-style-type: none">i. Define Scope of Engagementii. Engineering-Life-Cycle Analysis<ul style="list-style-type: none">i. Structures & Resourcesii. Work & Fulfilmentiii. Performance Analysis<ul style="list-style-type: none">i. Areas of Improvement (AoI)ii. Areas of Opportunity (AoO) | <ul style="list-style-type: none">iv. Design Engineering Improvement<ul style="list-style-type: none">i. Measures, programs and supportii. Cost/Benefitv. Deliver Engineering Improvement<ul style="list-style-type: none">i. Planning/schedulingii. Implementation and reviewiii. Performance Review/Acceptancevi. Continue ongoing programs and support |
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Table 1 TCEMP Process Overview

The TCEMP process comprises the four phases of Scope, Analysis, Design and Execution, grouped in 'front-end' and a 'back-end'. The front-end acts as a 'funnel' to quickly focus and minimise redundant effort. First, needs and objectives, performance and metrics are defined. The 'back-end' provides the improvement design and its implementation. While the complete process described here includes all possible work-elements, individual engagements only include those elements needed. Indeed, a full execution of all analyses represents the 'worst-case' scenario.

2.1 TCEMP 'front end' – Scope of Optimisation

The Scope of Optimisation (SoO) is defined through the Engineering Assessment, Life-Cycle Analysis and Performance Analysis. Each analysis builds on the previous, successively narrowing the focus. First, needs and objectives, performance and metrics are defined. These then determine the focus and extent of the analyses, which in turn define the focus and extent of the optimisation. The results are clear and consistent metrics, gaps and root-causes. The outcomes are compiled in the (SoO). The SoO defines Areas of Improvement (AoI) and Areas of Opportunity (AoO) and the applicable metrics and outcomes. The SoO forms section 1 of the overall Engineering-Management Document.

2.1.1 Engineering Assessment

The Engineering Assessment establishes the client's needs, objectives and constraints, priorities and target areas, context and stakeholders, influences and constraints. The outcome is the Scope of Engagement (SoE). The SoE provides a clear description of the areas to address, proposes solutions and sets the focus and objectives of the engagement. It forms the basis of the Statement of Work (SOW) and is provided prior to a financial commitment from the client. Engineering Assessment provides clients the opportunity to discuss concerns, ideas and objectives with experienced and independent experts – prior to a commitment. Clients receive a clear and quantified understanding of how the service applies to their specific operations, processes and organisation.

2.1.2 Engineering Life-Cycle Analysis

The Engineering Life-Cycle Analysis determines the structure and functions of the area targeted and who these achieve fulfilment across the client's engineering-cycle. The analysis identifies and defines the structure and resources; functions executed within and provided by the entity; work, work-flow, -stages and -processes and procedures and the general practices used. Capabilities and capacities and the utilisation of these are determined. Analysis is executed to the detail and extent defined in the SoE. Client staff are involved as agreed. The results form the first section of the Scope of Optimisation which in turn is section 2 of the Engineering-Management Document.

2.1.3 Engineering Performance Analysis

The Performance Analysis quantifies performance, requirements and metrics, building on the previous life-cycle analysis. Gaps, concerns and constraints and their root-causes are defined and as possible quantified or benchmarked. Performance metrics can e.g. span from tasks through to delivery and fulfilment. Metrics are traceable to the SoE. Areas that require direct improvement are defined as Areas of Improvement (AoI), areas where performance is within expectation, yet where improvements can be made are defined as Areas of Opportunity (AoO). The results form the second section of the Scope of Optimisation which in turn is section 2 of the Engineering-Management Document. The SoO is reviewed with the client and agreement reached on which areas to pursue and the priority of their implementation.

2.2 TCEMP 'back end' – Design and Delivery of Optimisation

The process 'back-end' provides the improvement design and its implementation. It comprises three concurrent paths: Immediate actions, Processes and Entity and Interdependencies and Programs, expediting delivery and minimising effort.

2.2.1 Engineering Improvement - Design

The Improvement Design provides the design of measures and actions to address the areas determined in the Life-Cycle and Performance analyses and achieve the specified outcomes. Costs and benefits are weighed. A complete and structured Optimisation Design Specification is provided. Measures span a range of areas, levels and extent, from individual task or work-designs, over staff-training and engineering processes to structured test-engineering and knowledge management practices. The design balances measures, timelines, cost and benefits in accordance with the agreed scope and criteria. The results form the Optimisation Design Specification (ODS), section 3 of the EMD. Design can incorporate previous work and engineering outcomes as well as integrate client staff and resources. The service provides only the work and deliverables needed and agreed.

2.2.2 Engineering Improvement - Delivery

Improvement Delivery provides the planning and scheduling, execution and support for the optimisation. It is documented as the Delivery Plan, section 4. of the EMD. Delivery and implementation are coordinated with the client and operations. Available resources and work are incorporated as feasible and agreed. Execution is in order of priority and typically commences with targeted measures for the 'physical layer'. Functional measures such as process designs are implemented subsequently or as feasible, concurrently. Operational and opportunistic measures such as interdepartmental efforts or integration with operational processes follow thereafter. Training and similar programs are executed as possible concurrently to all others. Each phase is reviewed individually. Once all measures have been implemented and effects are stabilised, an encompassing performance review is executed. The Performance Report constitutes the Final Acceptance and is documented in section 5. of the EMD.

3 Appendix – TCEMP Flowcharts

