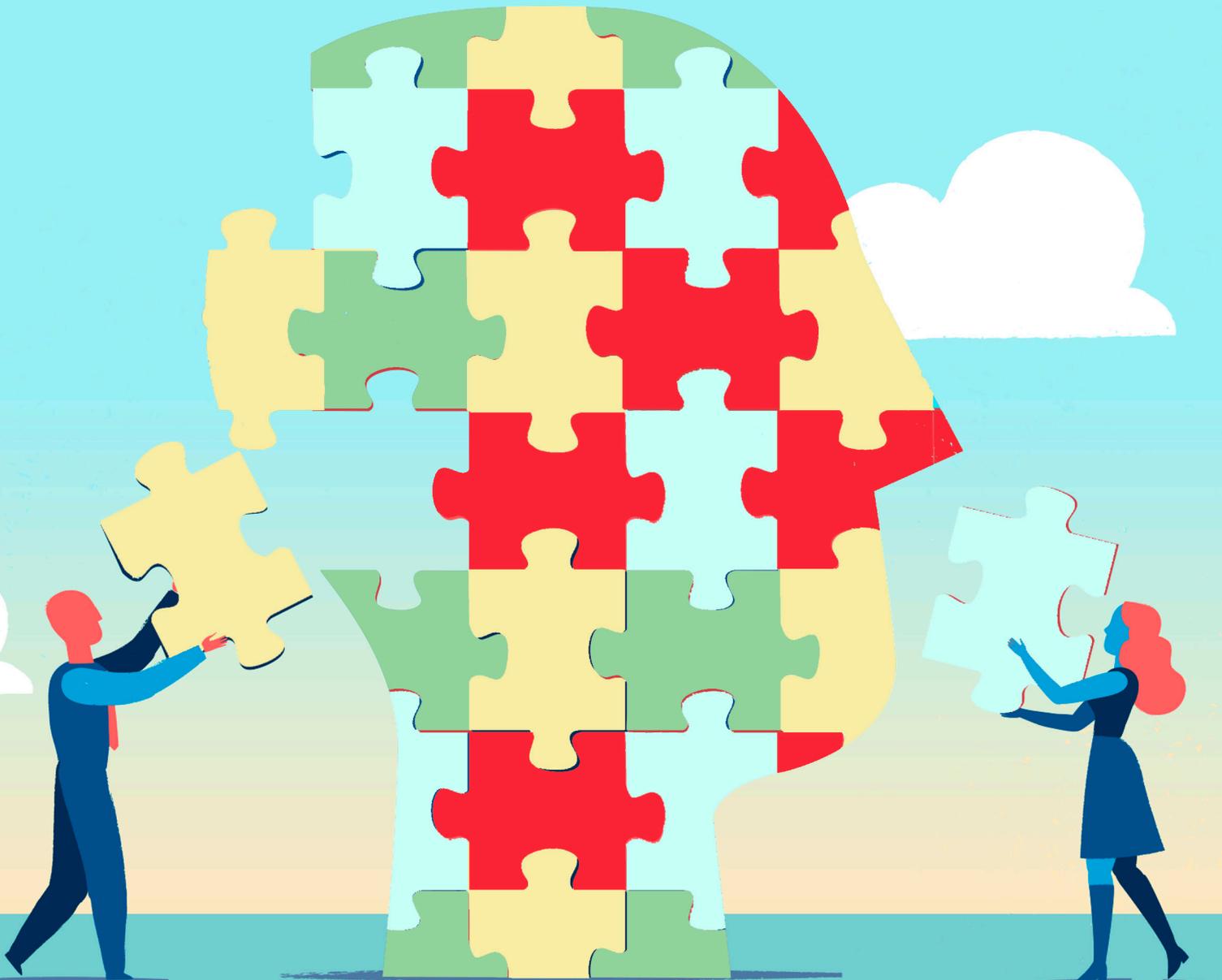


# MANAGING THE EPC-PMC MATRIX

**Joachim Schlor, Petra Zelenicka and Moritz Wagner, ILF Consulting Engineers, Germany, introduce innovations in the supply chain management for EPC pipeline projects, and how to ensure the project is successfully executed.**

**O**n time, on budget, and of the utmost quality. On the project owner's side these prerequisites for supply chain management (SCM) are a given; but for engineering, procurement and construction (EPC) pipeline projects, they may become a challenge. The involvement of multiple parties and complex processes will naturally result in time-demanding and overwhelming workloads



for all contributors to SCM. In EPC projects, the owner often outsources co-ordination activities to a project management consultant (PMC) for assistance and to ensure the project is executed in compliance with the defined scope of work and contract.

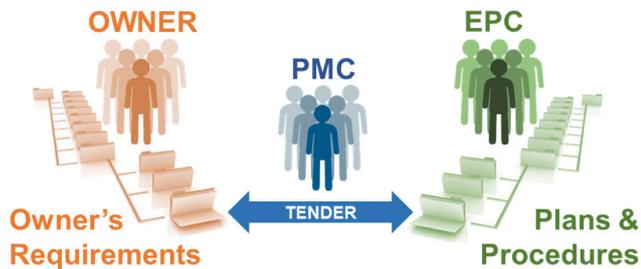


Figure 1. A project management consultant is the interface between the owner and EPC.

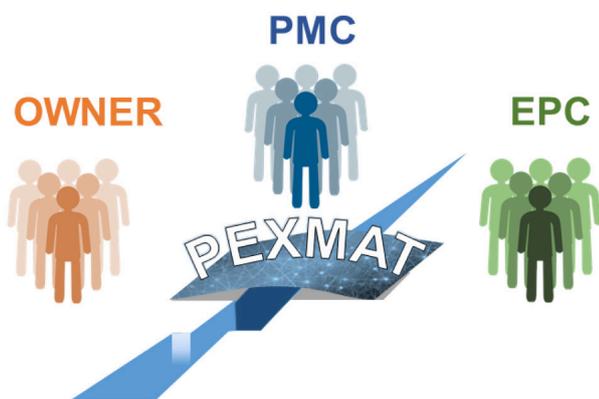


Figure 2. PEXMAT – bridging the gap between the owner and EPC contractor.

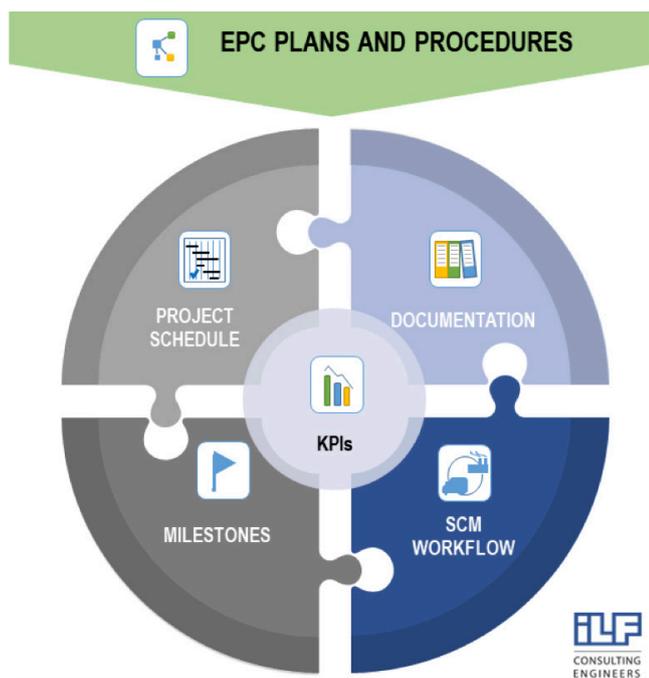


Figure 3. Project SCM information sets.

It is of crucial importance that the PMC is already involved in the EPC tender. The owner's requirements – often intricately linked to SCM – must be fully met and clearly documented in the EPC's plans and procedures. The PMC ensures compliance and synchronisation of the parties' documents. Distinct key performance indicators (KPIs) monitor and control the EPC's performance throughout the entire project duration. It becomes the PMC's responsibility to bridge the gap between the owner and EPC (Figure 1).

The PMC acts as the interface between the owner and the EPC contractors, advising the owner on technical and contractual matters and ensuring implementation of formal workflows via proper communication channels.

The vital importance of the latter requirement increases with the size of international pipeline projects. The level of complexity and communication difficulty rises not only with the number of EPC contracts and supply chains, but also with cultural differences among the parties involved. Differences may include interpretations of responsibilities, use of terminology, work styles, and labour conditions.

One minor misalignment or delay in SCM can set off a domino effect that results in further postponements, rising costs, and deterioration of quality. The industry has witnessed numerous examples where miscommunication and misunderstanding has led to failures and/or major setbacks in pipeline and station projects.

### What makes a competent PMC?

A competent PMC is a consultant expert team that makes the most of experiences and industry best SCM practices, turning them into a new and innovative management tool. This is where ILF Consulting Engineers has always been pushing for continuous improvement, and has developed its PEXMAT method designed to minimise and overcome major mismatches in SCM during project execution.

### How to tackle fundamental SCM/project management issues

Firstly, one needs to ask: What is the common language that everybody understands? The answer is simple: a visual overview. People no longer read, but scan text, trying to grasp the keywords. The connection and association of these keywords may well be lost.

Project managers, discipline leads, and individual contributors are flooded with project management documentation that features a tightly woven web of links and references to other discipline documents.

A visual representation of the information is considerably clearer. From this basic requirement, the concept emerged to connect all supply chain milestones, responsibilities of the parties, EPCs and PMC documentation and deliverables into an easily readable scheme. All these factors are transferred into a matrix.

This matrix concept becomes an execution cornerstone, hence the name PEXMAT: Project, EXecution MATrix.

During project execution, PEXMAT's goal is to bridge the gap between different SCM assumptions on roles and responsibilities in a project (Figure 2). This aims to ensure proper supervision execution at a glance. It also shows any potential bottlenecks and delays in advance, and provides the PMC sufficient response time.

Six crucial project information sets need to be put into relation for successful project SCM. Once all of these information sets are compiled, PEXMAT provides the PMC a user-friendly tool to control and manage the supply chain. Information sets, as depicted in Figure 3, include:

- EPC plans and procedures – these are the governing input documents defining the project workflows, based on the EPC's best practices and general methodologies.
- Project specifics – these encompass the particulars of the project and specify the project execution based on the typical project requirements. These are project schedule, documentation (technical and contractual), milestones, and SCM workflow.
- KPIs – these are selected based on the EPC plan and procedures and project specifics. EPC projects have general and project-specific KPIs.

PEXMAT is designed to provide a quick understanding of relationships between the information sets, illustrating how EPC's plans and procedures are related to project specifics, and how KPIs are related to the project requirements.

A typical EPC tender is comprised of up to 25 different topics in terms of an owner's requirements. Within each topic, distinct plans and procedures are requested from EPC contractors. These plans and procedures often reference further procedures from other topics – a recipe for confusion and misalignment in works execution. The PMC compares the EPC contractor and owner documents. Any overlaps or gaps in documents must be corrected to ensure a smooth execution.

### How does the method work?

Considering Figure 4, the upper part of the matrix (A to D) gives a brief overview of the project, serving as a check for correct references and documents.

The lower part of the matrix (D and E) transposes the formal upper part into a managerial context by applying the KPIs to the documents via a checklist. All documents and management tasks are divided into actions with transparent responsibilities.

In daily work, the user works in an input/output mode – as illustrated in Table 1.

By utilising PEXMAT, a PMC should be able to easily maintain the references as well as perform the checks required for performance assessment of the EPC from the start to the end of a project.

### Advantages of PEXMAT

- Supports an efficient tender evaluation.

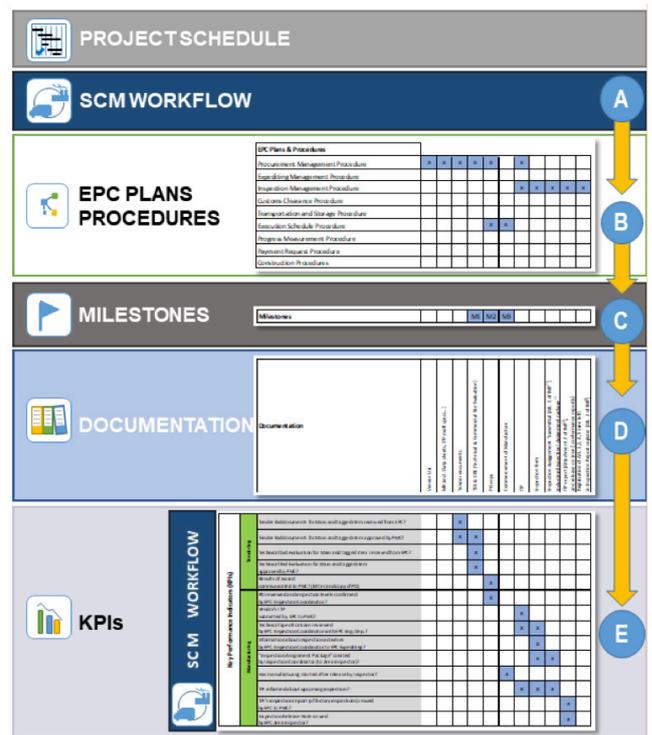


Figure 4. Components of the PEXMAT and selected KPIs.

Table 1. PEXMAT input/output mode		
	INPUT	OUTPUT
A	Where are we in the project?	SCM activity identified
B	Which EPC plans and procedures apply?	EPC's workflow activity identified
C	Are any milestones or deliverables linked to it?	Contractual relevance identified
D	Which reference documentation is of relevance?	Documents and correspondence for check identified
E	What needs to be assessed by whom?	Assessment of EPC's activity based on KPIs leading to acceptance, rejection or rework

- Simplicity in setting up while the project team is in planning phase.
- Ease of modification to project specifications.
- Improved acceptance of necessity to manage EPC by understanding and optimising EPC's plans and procedures.
- Simple communication of SCM focus when in discussion with EPC contractor and owner.
- Increase of internal and external efficiency.
- Increased transparency.
- Avoidance of mistakes and problems from the start.

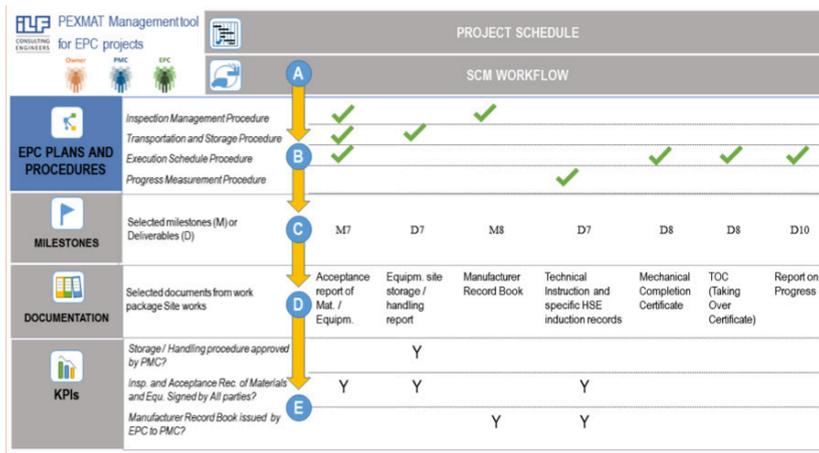
- Quick response after detecting any non-compliance in the EPC scope of work.

PEXMAT is designed to be an effective project management tool. Roles and responsibilities are clearly outlined and the project team can perform with high efficiency. Time and effort spent searching for project requirements and interfaces in documents are reduced to a minimum. Tasks and respective responsible person(s) from all parties are quickly identified, thus work is easily managed.

PEXMAT aims to: provide the owner and PMC with a clear picture of work processes and related documentation; to support easy monitoring of the EPC contractor's work; and to allow for intervention against potential bottlenecks. It covers all SCM related project phases, starting with the EPC tender and finishing with the taking over certificate.

### Example of the method in practice

Figure 5 shows a simplified example of PEXMAT in action to check an individual Acceptance Report of materials and equipment (AR) for a certain procurement package:



- Workflow activity: Procurement package delivered to site (point A).
- AR is defined in the Inspection Management Procedure and referenced in the Transportation and Storage Procedure and Execution Schedule Procedure (point B).
- AR is linked to milestone M7 (point C).
- For completion of M7 the Acceptance Report for the procurement package is needed, including the AR (point D).
- The responsible PMC engineer assesses the AR according to the KPIs given (point E).

Figure 5. A simplified example of PEXMAT in action.