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RECHTSANWÄLTE

A COMINDIS Feature: Top 10 Project risks in Plant Engineering and Infrastructure Projects

Top 3: Design Problems and defective works[1]

Top 1	Unclear scope of works.
Top 2	Miscalculation and cost overrun.
Top 3	Design problems & defective works.
Top 4	Extension of time & delay LD´s / liability, costs of prolongation and inefficiencies due to disturbances and variations.
Top 5	Deficiencies in commercial contract implementation (weak contract management, lack of notifications, and lack of collecting evidence).
Top 6	Lack of experiences and resources (technical and staffing).
Top 7	Contractual ambiguities (gaps, different interpretation of clauses, new clauses).
Top 8	Difficulties in enforcing claims (absence of a neutral court, long and costly proceedings).
Top 9	Relying on co-operation with weak third parties (e.g., planner, sub-contractor, or consortium partner).
Top10	Compliance, unknown markets, customers & contractors.

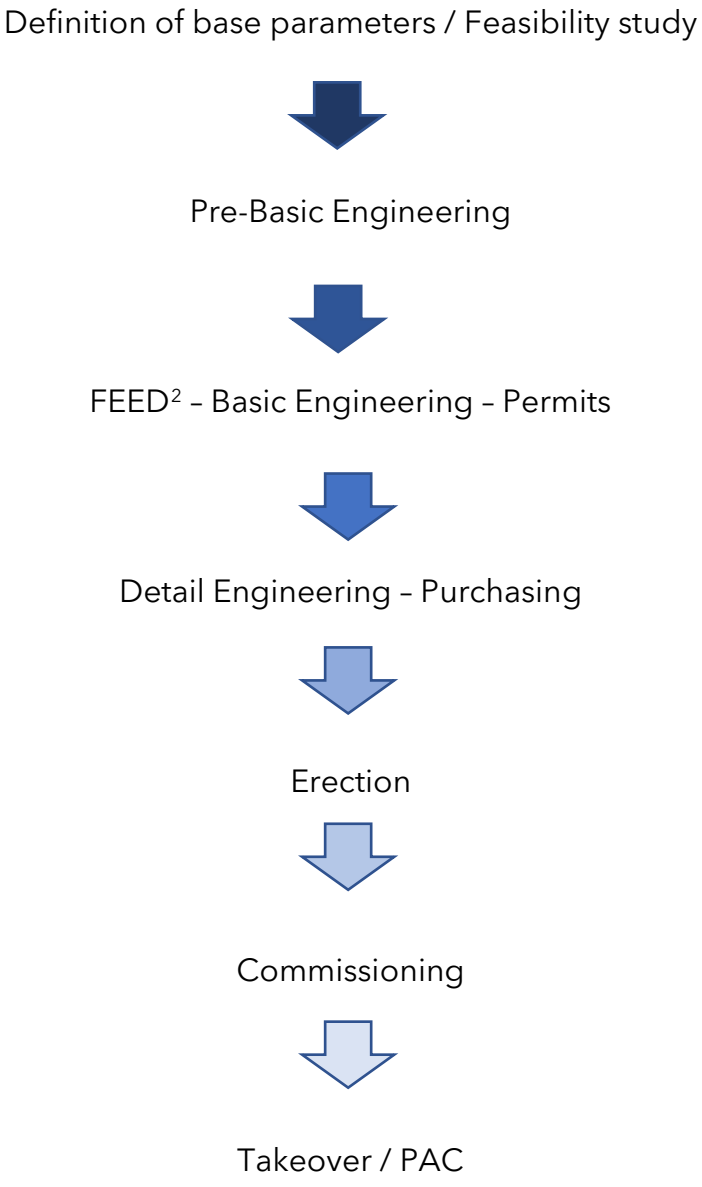
Design problems and defective works belong to the most important risks in (EPC / turnkey) plant engineering. There are several reasons for this fact:

[1] Please be aware that this publication shall not be taken as a legal advice. Any project requires intensive legal review and negotiations with the contractual partner.

Highest Customer requirements

The customer usually requires a perfect design and not only an appropriate solution. However, very often, the best possible technical design is not the cheapest or best value for money solution. Thus, there is an inherent tension between the "best" technical design and the price. To avoid disputes in that regard, it seems highly advisable to make the design solution transparent as early as possible in a close dialogue with the customer.

The design / erection phase in plant engineering projects follows in an ideal world the following flow:



[2] FEED = Front End Engineering & Design

Faulty design assumptions

Normally the design phase starts with the definition of base parameters and a feasibility study even prior to the pre-basic design. Such analysis is based on certain assumptions (investment, site, size of the plant, emissions, load, soil etc.). The customer's will normally require to endorse the previous planning done by another engineering planner (FEED) as if such drawings / calculations were produced by the contractor himself. If the contractor has not enough time to evaluate the correctness and completeness of such drawings, technical assumptions or calculations, the risk might increase significantly for its further basic or detail design. At a later stage, the customer will not accept that the endorsed drawings or basic design assumptions were wrong or incomplete.

Permits

Permits might have a significant impact on the engineering (e.g. noise reduction, emissions, health safety issues, HAZOP[3]). If permits were issued by authorities with unexpected conditions at a later time in project implementation, a dispute may arise, who has to bear the costs of replanning and prolongation. Therefore, it is advisable to have a clear wording in the contract, which party shall be responsible and what are the mutual duties in connection with permitting.

Missing Design Freeze

After the basic design has been completed, the *detail design phase* follows. Normally thereafter, the parties shall enter into a design freeze phase, which shall prevent a cost increase due to time-consuming and costly replanning. In plant engineering the commissioning of long lead items play an important role. To keep the deadlines, certain key components needs to be ordered as early as possible. If the design freeze cannot be reached, the whole schedule might be impacted. It is a very often seen issue that a project fails due to a missing design freeze.

The human factor

Although in most cases advanced CAD (Computer Aided Design) software is used for complex design, the factual input is still made by humans, and failures in the assessment of underlying assumptions therefore do happen. Especially in design failures, ex-post evaluations often show that the failures and omissions are rather simple and were certainly not unavoidable.

The four-eyes-principle should apply. If a design is complex and requires the consideration of many different items (as chemical or energy processes, safety assumptions, performance parameters, noise, emissions) and external factors (e.g. data from external service provides), it seems advisable to have a reliable control mechanism in place. This means: either an independent expert reviews the design

[3] HAZOP = Hazard and Operability study

or alternatively, a completely different team of internal experts (or even another company belonging to the same group of companies) is engaged to render a diligent peer review process.

Defects and Fit for Purpose

Of course, defects and disputes about defects might have very different causation. However, very often there are two elements playing an important role:

- Fit for purpose clauses and
- Conformity with EU regulations (e.g. EU Directive on Pressure Equipment 2014/68/EU; EU Directive on Machinery 2006/42/EC).

By a "fit for purpose" obligation, the contractor assumes a guarantee that its design, planning and the work carried out by him will lead to a certain result (i.e. success)[4]. If the Contractor fails to achieve this success, there is a breach of contract by the Contractor – regardless of how carefully the Contractor has worked to meet the agreed technical requirements or if he acted negligently. The client wants the contractor to take the risk that the design is "fit for purpose". The client has a strong interest in interpreting the "fit for purpose" promise rather broadly and will therefore want to define the term "purpose" as wide as possible.

Thus, unrestricted / unspecific "fit for purpose" clauses pose a significant liability risk for the contractor. To avoid later disputes, the purpose / functionality of the plant should be clearly, precisely and conclusively defined in the contract and the technical achievability of the purpose should be carefully checked; and "fit for purpose" clauses may refer to and be limited to a specific performance specification ("as specifically defined").

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[4] see UK Supreme Court in MT Højgaard A/S vs E.ON Climate and Renewables UK Robin Rigg East Limited [2017] UKSC59