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Critical success factors of a hydro power plant / dam construction & erection contract

– strategies to minimize project related risks by drafting adapted contracts -

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Introduction

Constructing and erecting a hydro power plant (HPP) or a dam is a complex project and a real challenge for the Owner (“Employer”) and the Contractor. Not only have their mutual interests to be balanced, but the Employer needs to align the provisions of the construction & erection contract with his obligations under various other project related agreements such as the Concession Agreement, the Grid Connection Agreement or Power Purchase Agreements [PPAs].

When constructing & erecting a multi – purpose water reservoir with a dam, the Employer has to take care not only of safety issues or environmental impacts, but as well of the other stakeholders such as the farmers using the irrigation system or the neighbouring communities wishing to use the reservoir as recreation lake.

In my experience, there are six critical success factors of a HPP or dam erection contract:

- A clear-cut, unambiguous **definition of the Scope of Works**, is *the* key clause in the construction & erection contract

The Scope of Works – including the quality requirements and a clear definition of the requested technical guarantees – is the reference for evaluating whether the plant has deficiencies or not. And, it is the benchmark in disputes between the Employer and the Contractor if the latter asserts a claim for “EOT” [extension of time] and compensation of additional costs, alleging that works requested by the Employer are “extra work” requiring a change order.

- Comprehensive rules regarding the interface responsibilities and the **interface management** between the different lots on one side and between the Employer and his Contractor on the other side. In some recent tenders, which I have seen, Employers have been very creative to shift as much of the related risks as possible to their various Contractors.
- A carefully drafted **allocation of typical risks**. This issue and in particular the cross-influence with a typical Force Majeure clause or, respectively, Force Majeure event is often not given sufficient thought. Not only might it be difficult to clearly identify the potential risks and evaluate the risk exposure; sometimes it seems that the contractual Parties do not have a clear idea of the legal consequences of a clear risk allocation in case of the occurrence of obstacles during the project execution.
- One important part of the risk allocation is the defining of the Contractor’s **verification obligations** regarding the information to be provided by the Employer or by the Employer’s other contractors and necessary for the Contractor to correctly perform its works. In this context it might be helpful to clearly identify and define a so-called “**rely upon**” **information**.
- Sophisticated provisions regarding the **reporting, information and cooperation** obligations to be complied with by the Contractor. Especially in large-scale hydro power projects and in a multi-contracting structure, a regular/ prompt and comprehensive reporting by the Contractor of all events having a cost and time impact is essential for the Employer.

- And last but not least the Parties should well define the **Provisional Acceptance procedure**, including the time frame for each step to be achieved (end of commissioning; successful trial run etc.) as well as the measuring instruments and methods for the technical guarantees.

The paper shows furthermore selectedⁱ legal aspects of those contracts and the do's and don'ts in order to avoid pitfalls:

- Provisions regarding an appropriate project organisation
- Employer's approval rights regarding design and the engagement of subcontractors as well as – in a larger sense – Employer's instruction and inspection rights
- The milestone schedule, Key Dates and Employer's remedies in case of delay
- The contract price, its structure and calculation as well as financial guaranties
- Defects and Employer's remedies; overall limitation of Contractor's liability.

1. Scope of Works

The definition of the Scope of Works is the core of the contract. Even in Turnkey Contracts where the risk of incomplete supplies is much lower than in a multi-contracting structure, a precise definition of the Scope of Works together with the limits of supply and – as far as applicable – the definition of the parties' responsibility with regard to the interfaces is of utmost importance.

There are different approaches to define the Scope of Works. In countries such as Germany, Austria or Switzerland, or in other countries with a long experience in hydro power plant construction projects, state utilities seem to prefer to specify their requirements down to the smallest detail, e.g. down to the properties of the construction material to be usedⁱⁱ, whereas in World Bank-financed projects Employers prefer a functional description of the plant to be delivered - leaving it up to the Contractor how to achieve this. A certain caution is appropriate: an Employer stipulating detailed specifications risks bearing the responsibility that the specified parameters are “fit for the intended purpose.” In those cases, a Contractor might be released from its responsibility for the functioning of the equipment if it fully complies with the requested specifications.

While drafting the Scope of Works clause and setting up the Employer's requirements, the parties need to avoid ambiguous expressions such as “of superior quality.” As far as the Contractor shall adhere to specific technical standards & norms of national / international standardisation bodies such as IEC, ASME or NEMA which do not directly result from the applicable legal normsⁱⁱⁱ or, respectively, which do not substantiate the “state of the art” requirement which the Contractor must comply with, those norms should be explicitly listed in the Employer's requirements. It is important to make reference to a specific edition (year) of an applicable standard and to avoid as far as possible contradictions while declaring various standards applicable – even if the contract provides for an order of precedence regarding the different annexes.

It is of utmost importance to determine the relevant date of application in view of the applicable laws and technical standards, and to determine to what extent the Contractor must comply with changed laws / standards and which party shall bear the risk in terms of time and costs in case the Contractor has to comply with changing laws. It seems to be clear – and often is explicitly stipulated as an obligation – that the Contractor must comply with all applicable laws, which means all laws governing the construction, manufacturing and erecting of the plant, wherever those activities will take place. Otherwise, the Contractor risks the infringement of law and the Employer risks site activities being stopped by the responsible authorities or, respectively, that the necessary operation permit will not be granted or will be withdrawn. However, that does not automatically mean that the Contractor bears the additional costs in the event of laws changing between the agreed relevant date of application (Contractors prefer to stipulate e.g. a date 28 days before signing of the contract as the relevant date) and the Provisional Acceptance date.

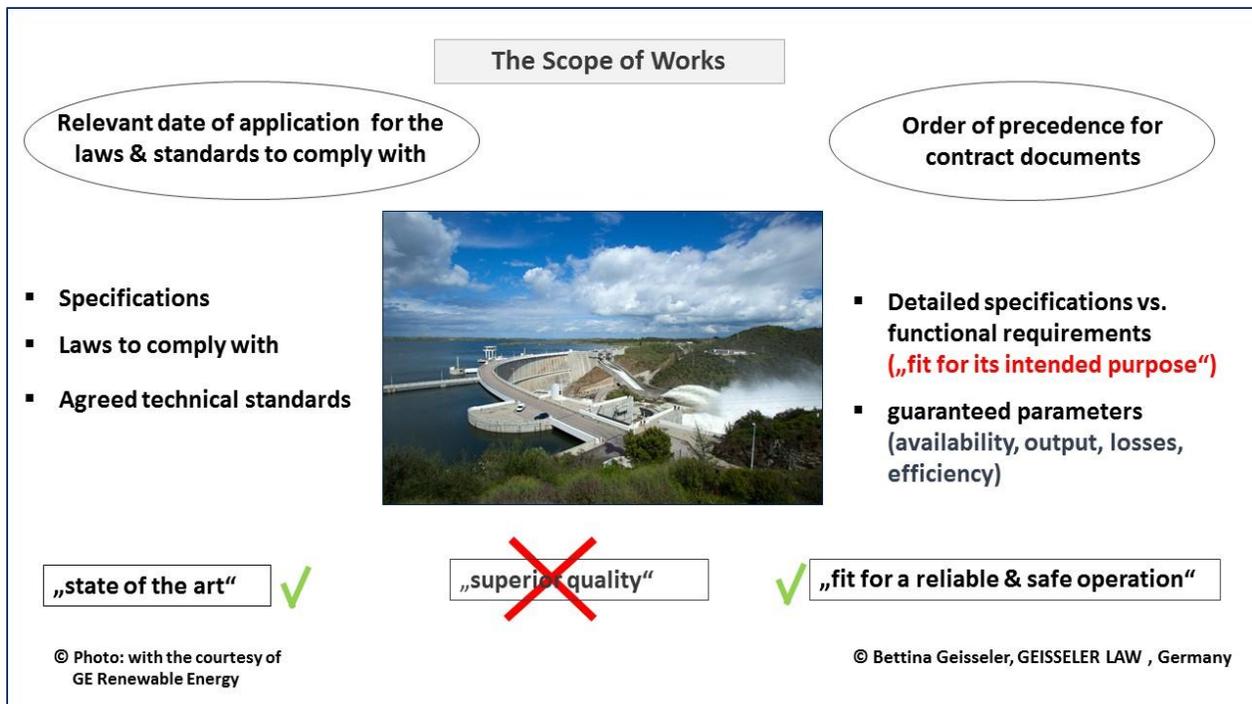


Fig. 1. Defining the Scope of Works

Regarding changing *technical standards* which are not legally binding, the Contractor will often be obliged to inform the Employer about this fact, but the Employer might reserve the right to decide whether modified (and more stringent) standards must be complied with and which of the parties will have to bear the financial consequences of complying with those standards. A typical contractual clause in this case would provide for a Change Order by the Employer entitling the Contractor to an EOT and / or compensation for additional costs.

And, last but not least, the parties must agree on the guaranteed parameters^{iv} such as – in view of a HPP - availability, output, efficiency and accepted losses, e.g. of the transformers. Depending on the structure and the available measuring methods, there will be a discussion of to what extent the Employer can obtain the requested guarantees not only for the whole plant, but also separately for the major components such as the turbine and the generator or, respectively, the entire generating unit.

Experience shows: for the purpose of evaluating the (legal and financial) impact of a definition / formula / curve in the tender documents defining the guaranteed parameter in question, the advising lawyer and the Contractor’s responsible project engineer should work in close cooperation and *not* each of them isolated in their “ivory tower” by studying either only the contractual provision in the body of the contract stipulating the legal consequences of non-compliance, or only the formula in one of the annexes to the contract. It makes a big difference if only events / standstills caused by the Employer or all events beyond the Contractor’s responsibility are not included for availability in the formula or, respectively, contractual clause stipulating the legal consequences.

2. Coping with interfaces

Coping with interfaces first of all requires both from a technical point of view as well as from a contractual point of view to identify the interfaces.

In particular in multi-contracting projects there are many interfaces between the different Scope of Works. However there are also interfaces between the Employer and other stakeholders of the projects, and last, but not least the interfaces between the Employer and the Contractor. The role of the contract is to clearly attribute the respective responsibilities and to define the mutual obligations regarding the interfaces. Besides the definition of the Scope of Works the interface *management* is one of the most critical success factors of the project execution. While the Scope of Works determines the limits of supply, and thus determines which components found at the interfaces fall within

the Contractor's responsibility, the interface management relates to the question of which of the parties is responsible for coordinating the different lots. The parties need to decide who shoulders the risk if one lot upon which another lot is dependent is performed poorly or delivered too late.

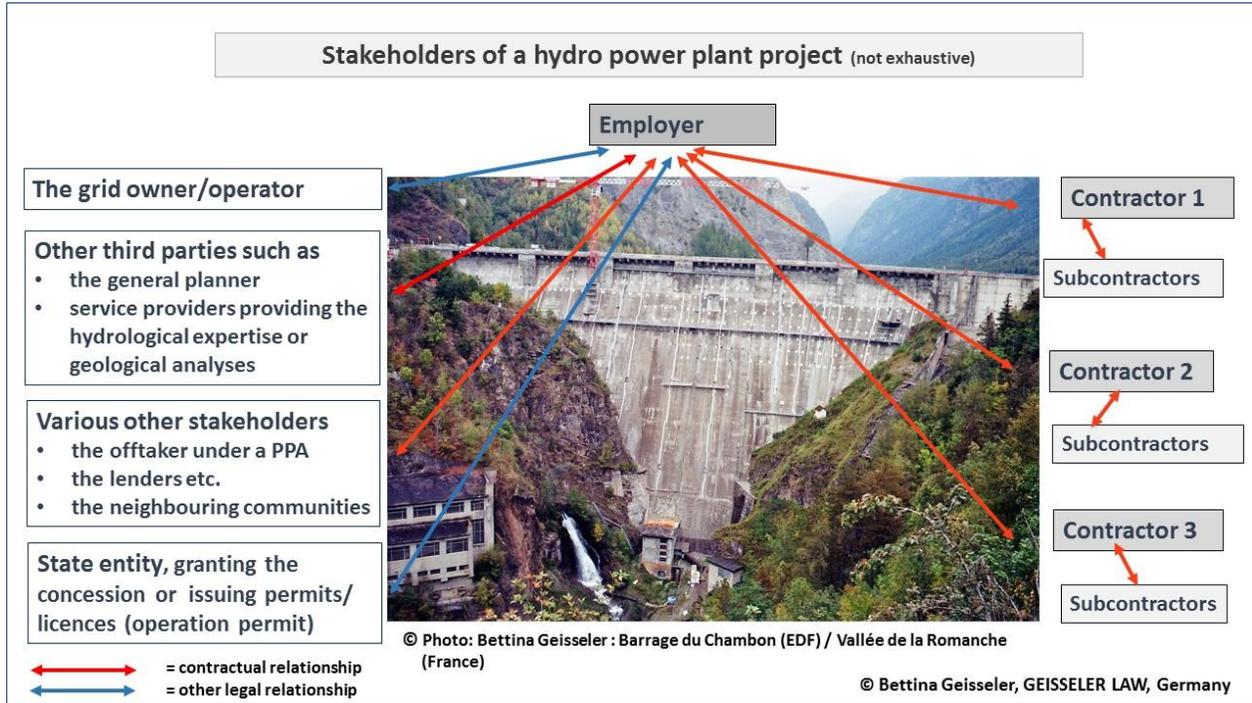


Fig. 2. Stakeholders of a hydro power plant project and possible interfaces

Regarding interfaces, usually the Employer tries to minimize his risk by stipulating in a contract two obligations, which the Contractor has to fulfil: (i) the Contractor must deliver – within the limits of his Scope of Works - a complete work and he is obliged to perform all supplies and services which are necessary for the functioning of the plant even if they are not explicitly mentioned in the Employer's Requirements; and (ii) the Contractor has to cope with the interfaces. It should be noted, that in case (i) this clause still requires Employers to clearly stipulate the limits of supplies or, differently spoken, the "Excluded Works" and that regarding case (ii) I would recommend to be much more specific. In such cases it can make sense to establish a detailed "Interface Matrix" in the annexes to the contract.

As shown above (see figure 2), one of several Contractors has no direct contractual relationship with anyone of the Employer's other Contractors. Thus he cannot exercise and enforce any rights vis-à-vis his Co-Contractors. Unless specifically otherwise agreed upon in a contract, the respective rights and obligations only exist between the contracting parties. Therefore it is typically - or should be, from a Contractor's perspective - the Employer or his engineer ("Owner's Engineer") who assumes the interface management responsibility.

In case of dependency between different lots (e.g. the alignment of the turbine/ generation unit with the foundations; or the diameter of a headrace tunnel) it might be in the interest of the Employer that one Contractor (Contractor 1) checks the design and/ or works of another Contractor (Contractor 2) and points out potential defects to the Employer. In this case the Employer not only has to oblige his various Contractors to check the other Contractors' works, but he also must e.g. oblige Contractor 2 to grant Contractor 1 access to the works at the site. If the Employer mandates an Owner's Engineer to coordinate or supervise the works on his behalf, the contracts with the various Contractors have to stipulate the rights and powers of the Owner's Engineers vis-à-vis the respective Contractors. And if the Employer wants all his Contractors to be present and cooperate in the process of the Provisional Acceptance, he must stipulate this in each Contract.

The Employer himself has various other contractual/ legal relationships to other stakeholders of the HPP project. He must comply with the conditions of the Concession Agreement, the grid code requirements or the obligation under a Power Purchase Agreement. In recent years Owners/ Operators have in some cases entered directly into contracts with

neighbouring communities or other stakeholders, e.g. if huge water reservoirs serve a multiple purpose (besides power generation: e.g. irrigation, fishing and recreation). The Owner (Employer) is well advised to pass on the requirements of these contractual relationships, as far as they are influenced by the construction and erection works, individually to each of his Contractors and make them an integral part of the contracts with its civil works or other Contractors.

3. Risk allocation – unforeseeable events

The allocation of risks between the Employer and the Contractor and the balancing of the risks in view of the calculated and offered contract price is one of the most challenging and difficult tasks while drafting and negotiating a hydro power plant erection contract. Not only might it be difficult to clearly identify the potential risks and evaluate the risk exposure; sometimes it seems that the contractual parties do not have a clear idea of the legal consequences of a clear risk allocation, and in particular the cross-influence with a typical Force Majeure clause or, respectively, Force Majeure event. A Contractor who accepts a clearly identified risk (a) cannot claim EOT and / or compensation for higher costs in case of hindrances during the project execution due to the occurrence of that risk, and (b) still has the responsibility for “care and custody” of the plant. In the worst case the Contractor is obliged to rebuild parts of the already erected plant in the event that the risk materialises and leads to the (partial) destruction of the plant.

The more complex a project is, and the more stakeholders in the project exist, the more difficult it will be to balance the risks because the provisions of all the other agreements have to be taken into account.

In BOT schemes the lending institutions and consequently the Employer want to have cost certainty. The financing banks have a vital interest that the Owner/ Employer does not assume risks which would endanger his possibility to comply with his obligations under the terms of the financing agreement and thus jeopardize the whole project.

There are typical risks in HPP projects, in particular in connection with dams – or to put it differently: unforeseen conditions, where the risk that they materialise is considerable high. The materialisation of these risks might lead to considerable delays and in consequence considerably higher costs.

The contractual parties should identify and discuss in detail the major and typical project-related risks, such as the (remaining) risk of different geological subsurface conditions other than those investigated, which might have a major impact not only on the subsurface structure for the HPP, but in particular on the stability and thus the design of the dam. They should carefully evaluate these risks and then allocate them to one of the parties.

Tender documents quite often contain (Employer-friendly) clauses such as “*Contractor is thus deemed to be fully aware of all constraints, incidents, which may result from the natural site conditions (climatic, atmospheric, meteorological....), the nature of the ground and the subsoil and more generally from any elements and circumstances likely to have an influence on the performance of the Contractor’s Works*”. According to my experience it will depend not only on the applicable law but very much on the project, the negotiating position of either party, and the course of the negotiations, whether such a “catch-all” clause with a broad wording can allocate or, respectively, shift the total risk exposure for a majority of (quite important!) project-related risks to the Contractor in a legally valid way.

In a well negotiated, balanced contract, the taking over of major risks with at least a medium probability of occurrence will normally lead to a proportionate increase of the contract price.

Within this context it should be reminded, that the contract law, i.e. the applicable law governing the contract, sometimes provides for solutions which the contractual parties do not like. In this case they explicitly have to derogate from the otherwise applicable provisions and stipulate provisions reflecting their intentions.

There is a wide range of possibilities for contractual solutions. Often, the party responsible for performing the environmental investigations in the planning phase of a project, such as the geological or hydrological investigations, will take the risk that the circumstances prove to be different from previously assumed. Another example out of a tender, which I have seen: under the applicable law the subsurface risk for infrastructure installations (bridges, power plants etc.) was with the Employer. The relevant contract provided for, that (a) the Employer had done extensive subsurface investigations, but (b) the Contractor had to perform additional subsurface investigations “*as far as they are necessary to perform the Works*” and that (c) (only) under fulfilment of these conditions (a) and (b) the subsurface risk was assumed by (i.e. remained with) the Employer, which then – in the event of circumstances different from assumed – had to grant the Contractor an extension of time and / or compensation for higher costs.

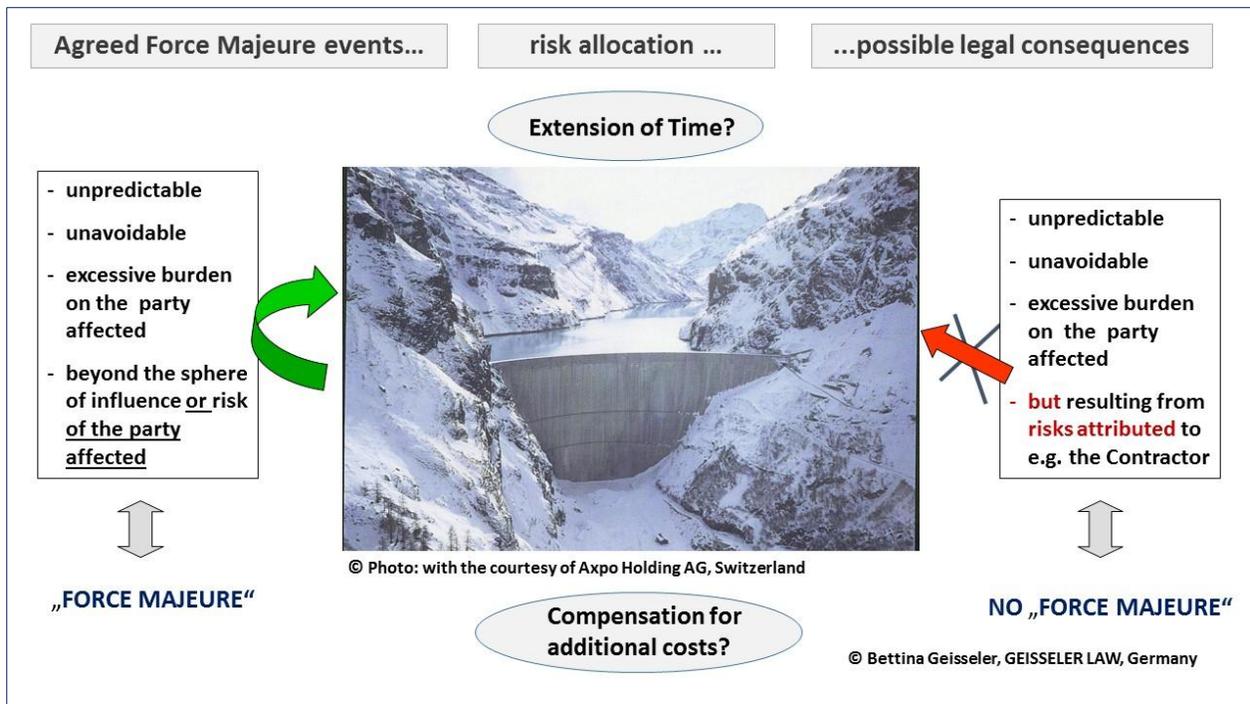


Fig. 3. Allocation of risks – unforeseeable events

The employer-friendliest solution I have ever seen in tender documents were contractual provisions obliging all Contractors to coordinate and manage the interfaces among themselves with the consequence of a *joint and several* liability of all Contractors concerned towards the Employer for the performance of the interfaces!

4. Design data – “rely upon information” delivered by the Employer

Not only in multi-contracting projects there is the interface risk. In any contract between the Employer and the Contractor – even in “Design – Build Contracts” there is an interface risk between the obligations of the Contractor and the Employer’s duties. Usually the Employer has established the concept design and design basis. The Employer usually provides the Contractor with information regarding the circumstances at the site, such as the hydrological and geological expertise, which altogether forms the design basis. The Contractor will e.g. design its turbines or the dam based on these data and agree on the guaranteed performance parameters.

In order to avoid discussions about the consequences of deviating circumstances, I recommend to my clients that they clearly stipulate to what extent this information provided by the Employer is what is known a “rely upon information”, or whether the Contractor needs (as some tender documents explicitly provide for) to cross-check all information made available to it and inform the Employer of discovered discrepancies or errors.

5. Monitoring of the Project: Contractor’s reporting obligations

In complex and large-scale hydro power plant or dam erection contracts, Employers are well advised to require from the Contractor continuous and regular, prompt, complete and accurate information on the stage of completion of the design, manufacturing and erection process and in particular on the occurrence of hindrances having an impact on the price or the time for completion.

Only such a reporting system will enable the Employer to maintain control over the entire project and to realise at an early stage if possible events may have a negative impact on the time for completion and/ or the costs or the contract price. I have seen contracts (governed by a law of a civil law country) providing that the breach of those reporting obligations (e.g. the non-delivery of the requested weekly project reports) shall entitle the Employer to make use of a right of retention relating to due (payment) amounts up to a relatively high amount.

6. The Taking Over procedure and the Provisional Acceptance

It is of utmost importance to define in detail the different steps which have to be undertaken: completion of installation (“ready for Commissioning”), Commissioning (“dry” and “wet” Commissioning including tests during Commissioning) and trial run and – to the extent applicable – tests after the Taking Over^v. The parties should agree on the program for the Commissioning and should in particular determine the preconditions which must be fulfilled before the next stage of the procedure can begin in order to avoid any evaluation margins: especially the cooperation duties of the Employer upon which the Contractor depends should be clearly stipulated together with exact deadlines within which the Employer must either approve or reject the works for (contractually) justified reasons. Contractors prefer the insertion of a clause that the plant is deemed to have been accepted in the event of no reaction by the Employer within the stipulated deadlines. Regarding the trial run, under which conditions it must be prolonged or even repeated should be agreed upon.

Regarding the evidencing of the guaranteed parameters, the contract should clearly state – ideally already at the moment of signing – at which moment (during Commissioning or after Taking Over), over which period, and with which measuring methods and instruments the achievement of the guarantees must be evidenced or, respectively, by which certifying body the parameters must be verified in case of later disputes between the Employer and the Contractor. Once the Contractor has successfully proven that the plant is in compliance with the contractual requirements, the Provisional Acceptance Certificate shall be issued.



Fig.4. The Taking Over (Provisional Acceptance) Procedure

7. Further selected aspects of the contract – how to avoid pitfalls

7.1. Project Organisation

The Employer should think about a project organisation on Contractor’s side which will guaranty an efficient project execution. The contract can and should contain provisions regarding the qualifications of the Contractor’s Project Manager bearing the overall responsibility for the project progress. Subject to the applicable law it is legally possible to submit the replacement of the Project Manager by the Contractor to penalties.

Furthermore the Employer is well advised to determine the language skills of the key personal as well as the way of communication between the parties and on site. The same applies for the way in which the requested project - related documents should be delivered by the Contractor to the Employer – without prejudice to the official documents to be submitted to the state authorities.

7.2. Quality assurance: Employer's approval, instruction and inspection rights

Usually the Employer reserves the right to approve the design documents. It should be noted that the Employer's approval in no way relieves the Contractor from his own responsibility to deliver a work in accordance with the contract and in particular without any deficiencies. It should be clear that a non - approval can only be based on reasons of non - compliance of the design documents with the contractual requirements. A well drafted contract should stipulate the deadlines, until when an Employer has to grant his approval.

Sometimes the Employers explicitly reserve themselves extensive rights to give detailed instructions regarding the execution of the works. Without prejudice to the question whether those instructions might be considered as Change Orders entitling the Contractor to an EOT and a price adaption, some caution is appropriate: in the case that the Contractor considers those instruction to jeopardize the success of the works, he must inform the Employer (I advise: in a written way) about his concerns. Only then he will be released from his responsibility for defects if the Employer insists on his instructions and thus forces the Contractor to follow them.

Typically the contracts oblige the Contractors to seek the Employer's prior approval for the major subcontractors or suppliers of critical components. This can be done by way of approval in each particular case or by way of a list annexed to the contract establishing a number of pre-approved suppliers. From the Contractor's perspective a certain caution is appropriate in the latter case. In order not be faced with prices of the pre-approved sub-suppliers far beyond the usual market price, the Contractors should insist on a contractual clause allowing them to deviate in justified reasons from this list (under the condition that the alternatively engaged sub-supplier meets the quality requirements) and to state as one of the possible reasons the fact that the pre-approved sub-suppliers request prices being x % above the European/ worldwide market price.

Other important instruments are broad inspection rights exercised by the Employer and the detailed specification of a quality assurance system/ quality assurance plan, which the Contractors are obliged to comply with and which they are to impose on each single subcontractor/ sub-supplier in the supply chain. A typical example is the obligation of the Contractor to grant the Employer access to the Contractor's production sites for the purpose of inspections of the manufacturing process, especially of the manufactured (key) components before they are integrated into the plant during the erection process. Experience shows that it might be in the Employer's interest not to leave it to his Contractors to inspect the manufactured parts at the sites of their subcontractors, but to make large use himself of his rights and to double-check, even if the components in question are manufactured by a sub-sub-supplier and/ or in production sites 'at the other end of the world'.

7.3. The time (milestone) schedule, Key Dates, "Extension of time" and Employer's remedies in case of delay

Contracts usually provide for a time schedule with one or more binding dates which the Contractor must comply with. Sometimes the parties do agree only on the date for completion as a binding date, but quite often various intermediate dates (milestones) are defined as binding. These milestones are usually linked with the obligation to pay Liquidated Damages [LDs] in the event of non-achievement of the defined milestone in due time.

During the course of the project execution, the Contractor will develop detailed time schedules taking into account the milestones of the overall framework time schedule.

Depending on the applicable law, there are several legal issues to discuss in this context, which would go beyond the scope of this paper. As an example it shall be mentioned that, in contracts governed by a law based on the common law tradition, the "extension of time" concept should be explicitly inserted into the contract in order to avoid the LDs regime being null and void. On the contrary "civil law" codes often explicitly stipulate that the Contractor is released from his obligation to perform and thus not liable to pay any LDs if the delay is not attributable to him, but occurred due to a Force Majeure Event or to the Employer's behaviour. And often these codes provide already for the payment of a compensation for damages in case of a delay attributable to the Contractor.

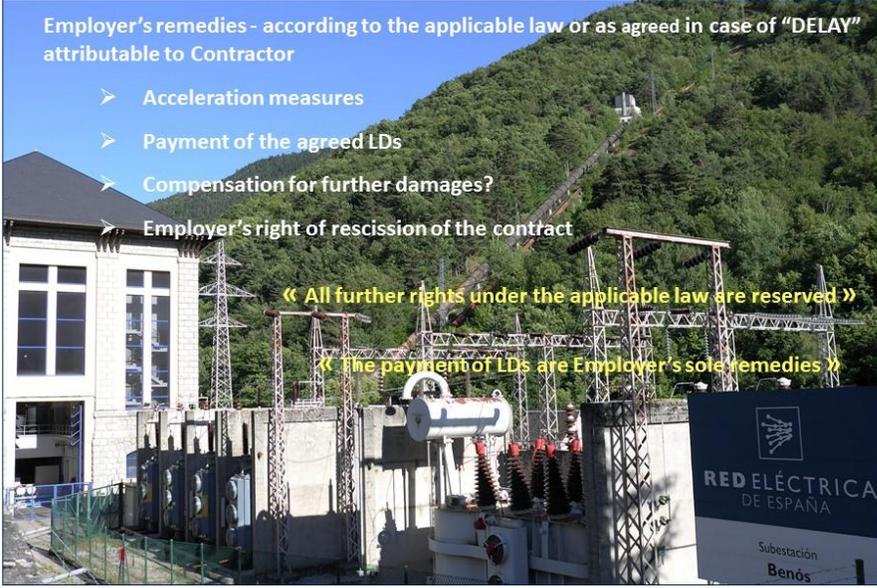
It is thus advisable to draft clauses which stipulate in detail the prerequisites and consequences of a delay attributable to the Contractor. Besides an immediate information obligation towards the Employer and the taking of reasonable acceleration measures, those consequences are usually the payment of LDs. It is crucial to agree whether the mentioned remedies shall be the Employer's exclusive remedies in case of delay, or whether the Employer is entitled to further remedies resulting from the applicable law such as the indemnification for (further) damages actually suffered and/or even rescission rights (e.g. under the application of the German Civil Code – "BGB"). Sometimes the

contracts provide for a combination of both: if the delay attributable to the Contractor is so extensive that the agreed cap for LDs is reached, the Employer might reserve a rescission right. In all civil law systems I am aware of, those remedies available under the applicable law which the parties do not want to apply, have to be explicitly excluded.

At the same time it is advisable to define the Employer’s Key Dates, which means binding dates, on which the Employer has to deliver items (such as decisions, information or even material) items, on which the Contractor depends in order to be able to duly perform.

And last, but not least, the contract should determine not only the cases (prerequisites) in which the Contractor is entitled to an EOT – and a compensation for additional costs - , e.g. any hindrances beyond his responsibility which prevent him from performing, but stipulate how much time extension will be granted. Example: in cases of long-lasting Force Majeure events a Contractor might want his personnel to work / use his machines on other sites; thus he will insist on an adequate remobilisation period. The Employer might have an interest that the Contractor stays on site with his personnel and the machines. A contractual provision could oblige the Contractor to stay on site in case that the hindrance does not last longer than x months against compensation of his additional cost occurred for holding the personnel and machines available on site.

The Time schedule: time for completion and intermediate milestones



Employer’s remedies - according to the applicable law or as agreed in case of “DELAY” attributable to Contractor

- Acceleration measures
- Payment of the agreed LDs
- Compensation for further damages?
- Employer’s right of rescission of the contract

« All further rights under the applicable law are reserved »

« The payment of LDs are Employer’s sole remedies »

Photo: B. Geisseler : HPP Red Eléctrica, Val d’ Aran, Midi-Pyrénées (Espagne) © Bettina Geisseler, GEISSELER LAW, Germany

Fig.5. Employer’s remedies in case of delay

7.4. The contract price, its structure and calculation as well as financial guaranties

Even though the parties usually agree on a lump sum price which is “fixed and firm and adjustable only in the explicitly mentioned cases,” the majority of disputes in large-scale projects relate either to the question of an entitlement to an EOT or to the question of an entitlement to a compensation of higher costs. From the Contractor’s perspective, in principle every event beyond its responsibility that prevents or hinders a due performance and results in additional costs should entitle the Contractor to a compensation of higher costs. As an exception, the parties sometimes agree that a defined Force Majeure event only entitles Contractor to an EOT.

Even though a lump sum price is agreed upon, the Contractor often is obliged to detail the price and quote prices for specific works or components. This obligation or, respectively, the obligation to deposit the (confidential) price calculation in an escrow account with a notary public shall prevent later disputes about adequate price adjustments in case of Change Orders. From the Contractor’s perspective, it is advisable to agree on a price escalation clause.

The usual financial guaranties are the advance payment bond, the performance bond and the warranty bond – which all should be in the form of a guaranty on first demand. The Employer’s interest in a good performance can

additionally be secured by agreeing on a regular deduction of what is known as retention money (in a certain percentage) from every due payment, and a performance guaranty provided by the (if any) Contractor's ultimate parent company.

7.5. Defects and Employer's remedies; overall limitation of Contractor's liability.

If, at the end of the acceptance procedure – perhaps after repeated tests – the Works (as per Scope of Works) or any part of them show to be incomplete, defective or otherwise fail to comply with the requirements of the contract, usually the Employer is entitled to

- reject the Works, insofar as the defects are not merely minor ones not affecting the normal and safe operation of the plant, and to request the remedying of the defects. In the case of minor defects (punch list items), those will not prevent the Taking Over; or
- accept the plant as it is and reduce the contract price accordingly or, respectively, request the payment of LDs for non-achievement of technical guarantees.

In the case of repeated failure to meet the contractual requirements, the Employer usually has the right to engage a third party to remedy the defects at the cost and risk (regarding warranty!) of the Contractor. If repeated remedying efforts do not lead to the requested success, alternatively the Employer usually has the right to make use of its right of rescission and additionally to claim compensation for incurred damages. This will be the worst case for a Contractor, who will then be obliged to destroy the plant and restore the site and refund any amount received under the contract.

The contract should state whether and to what extent the parties want to exclude any (additionally) available remedies under the applicable law. There might be reasons for the parties to exclude Employer's right to declare rescission of the contract, or at least to limit this right to cases where the Employer does not receive the necessary operation permit because of the existing major defects.

Special attention should be paid to design defects or so-called serial defects. In cases of (proven) serial defects the Contractor often will be obliged to replace as well the not / not yet affected components.

The *non-achievement of the guaranteed parameters* is a defect. Normally, contracts provide for the payment of LDs, if the Contractor is unable to achieve the parameters after repeated remedying efforts. Here again, the parties need to decide whether the payment of LDs are the Employer's exclusive remedies (this has to be explicitly mentioned, or the available remedies have to be explicitly excluded) or whether the Employer can claim further remedies resulting from the applicable law. Often the contracts provide for a combination of both: LDs and right of rescission in case that the actual performance falls below x% of the guaranteed (performance) parameter.

The Employer has the same rights in case of defects (existing at the moment of the Provisional Acceptance) showing up after the Provisional Acceptance, i.e. during the warranty (defect liability) period. The term of the warranty period should be negotiated between the parties. However, there are legal systems which mandatorily provide for certain terms^{vi}.

Contractors want to *limit their risk by limiting the overall liability*. A typical concept is to insert caps each for LDs resulting from delay and from the non-achievement of the guaranteed parameters. If the parties generally exclude Employer's right of rescission or determine the LDs as Employer's exclusive rights in case of delay / non-achievement of the guaranteed parameters, the Employer is, however, often entitled to the right of rescission once the caps are reached. Usually, the Contractor's overall limitation is determined to be 100% of the Contract Price, and it is common practise to exclude his liability for what is known as consequential damages (with some exceptions, e.g. in the case of patent infringements).

The Author

Bettina Geisseler (www.geisseler-law.com), spent many years as senior legal counsel/ Head of Legal in international companies operating in the field of civil & electrical engineering and the construction & erection of power plants, dams or other large infrastructure projects (among others: Losinger, Berne; ABB Switzerland; Babcock Borsig Service GmbH, Oberhausen).

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She has extensive experience in drafting and negotiating various types of contracts (traditional supply or EPC contracts or contracts within a BOT / BOOT scheme) for large-scale power plant projects (including project financed projects/ contracts with IPPs) - be it tailor-made contracts or standard form contracts such as FIDIC contracts.

Bettina Geisseler is fluent in German, French and English. She regularly gives lectures at the TU Dresden (Technical University) and the Università di Corsica Pasquale Paoli, Corsica/ France.

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ⁱ The paper can only deal with some important contractual issues. Other important issues such as questions of the *applicable law* (not a “quantité négligeable”, because it will e.g. decide upon the available remedies and might contain mandatory legal provisions which the parties must consider while balancing their mutual interests!), or the *dispute resolution mechanism* (state courts vs. arbitration) could not be taken into consideration. The aim of this paper is to alert Owners / Employers or Contractors of critical issues potentially having a major (financial) impact on the execution of a dam / hydro power project, and to suggest, which critical issues should be considered and taken into account when drafting the contract. In no way shall it constitute and substitute for a specific legal advice, which will depend inter alia on the applicable law.

ⁱⁱ E.g. RWhM Richtlinien für Werkstoffe in hydraulischen Maschinen des Verbands der Elektrizitätswerke Österreichs.

ⁱⁱⁱ Cf on an EU level the *BREF Documents (Best Available Technique Reference Documents)*, which substantiate the requirements of the *DIRECTIVE 2008/1/EC of the European Parliament and of the Council of 15 January 2008 concerning integrated pollution prevention and control* for the approval practice of the state authorities granting operation permits for industrial installations. The same applies in case of authorisations under the German environmental law: the *BVT Merkblätter* substantiate the “state of the art” requirement, stipulated by the relevant legal provisions.

^{iv} These parameters are sometimes referred to as “technical guarantees” or “functional guarantees”

^v The wording might vary from contract to contract (e.g. FIDIC or, respectively, project - specifically drafted contract)

^{vi} Cf. “la garantie décennale” in French law