



## White Paper 2018-14

### How to Handle Large Complex Projects That Involve Remote Sites

*Some types of Large Complex Projects involve construction in remote areas that have low levels of pre-existing infrastructure. This can even reach the point of having to include in the project scope to build some or all of the transportation, communication and accommodation infrastructure required for the project and/or the continuous operation of the facility. The challenges associated with these projects must be tackled specifically since the success of the project may lie as much in the successful delivery of these surrounding scopes as in the delivery of the core facility itself. Other issues to be considered include the proper preparation regarding tooling and equipment. In a first White Paper we have presented how to rate the remoteness of a project. In this White Paper we will develop how to account for remoteness in the execution plan of the project.*

#### Additional activities at project definition stage

Since logistical aspects cannot be taken for granted, they need to be specifically addressed during the project definition stage. This scope needs to be the topic of a specific stream that involve personnel familiar with the issues of remote projects logistics and personnel that are knowledgeable with the particular aspects of the country or region.

If possible, it is essential to plan for early site works and analyse the schedules that have been achieved so as to calibrate productivity figures and have a good understanding of the issues that will be faced during construction. This may take the form of a test pit for mining projects, utility buildings for a plant (power, water etc). Information from existing facilities at the same location may be used, however this data needs to be sufficiently recent.

Those early works might require an up-front investment during the project definition stage, but the information they will deliver to build a realistic project schedule is invaluable.

#### Influence of remoteness on estimating

The importance of logistics costs in the Capex and Opex increase substantially with the degree of remoteness, hence an accurate estimate of those costs must be developed during the definition stage based on a detailed breakdown of those costs.

Specific issues will include:

- Direct costs related to the logistics of personnel. These include extra travel time, organisation of the transportation of the flow of personnel. The policy regarding rotations on/off site must be defined early as this will greatly influence those costs,
- Costs related to the accommodation of personnel. When a camp must be built as part of the project it is essential to include sufficient contingency capacity to allow acceleration of work for certain trades if required. Thought must be given to the possible re-utilisation of part of the camp for exploitation purpose, which has an influence on the specifications of construction. Specific issues such as

the inclusion of suitable medical facilities, medicine and resources must be included in the plan based on the size of the construction team,

- It is essential to ensure that as much as possible, construction work will not be interrupted by the unavailability of spare parts, specialist maintenance, and basic consumables. Thus, additional contingencies must be identified for all those aspects. Costs related to additional procurement and proper storage of required spare tooling and equipment, extra spares for construction equipment to guarantee availability, and interim storage of fuel and water must be costed in,
- The transportation of heavy or large equipment must be considered and fully costed. This must include both permanent material and the required construction equipment, which can also be quite problematic to mobilise on site. Particular restrictions on size and weight of equipment that can be transported must be considered,
- Additional spare capacity for logistics to site must be factored in to allow the project to respond to unforeseen events,
- Due to the uncertainties of logistics, spare capacity for storage and preservation must be provided for at the delivery point and on site. This must be planned and costed for.

**Remoteness has a major impact on project execution. It will drive cost and a large part of the contracting strategy.**

#### Remoteness contingency

Finally, a specific contingency must be added to estimates to account for unforeseen events that will impact project execution. This specific contingency will increase with remoteness. It needs to be commensurate with the risk of project site stand-by, i.e. be equal to the project site maximum daily running cost (all included) multiplied by the potential stand-by duration over the course of the project. This duration in turn depends on the site access issues. It must be based on the time required to bring on site a critical spare part for a typical construction equipment, multiplied by the project construction duration.

## Specific aspects to account for in the project execution plan

Mutualisation of means and impact on the contractual strategy

Remoteness will require the Owner to mutualise and organise a number of aspects related to project execution and offer those services to the various contractors mobilised on the project either free of charge or against a pre-defined cost (e.g. on-site accommodation per person per day). The services may be subcontracted to specific contractors that are managed directly by the Owner.

The following services will generally be mutualised on projects of moderate remoteness:

- On-site accommodation services
- On-site connectivity
- Logistics of oversize material and equipment (typically that cannot fit in a standard container)
- Heavy lift capabilities

The following additional services will generally be mutualised on high remoteness projects:

- On-site fluids supply (power, water, materials) (production and distribution)
- General lifting and heavy transportation services on site
- Personnel transportation to/from site from a mobilisation point that is suitably accessible through international travel for personnel,
- Material, spares and consumables and spares transportation to/from site from locations easily accessible by standard logistics transportation. The Owner will generally provide interim storage services on a yard or warehouse at this intermediate point that serves as operational dispatch center under its direct responsibility so as to prioritise transportation to site.

Certain aspects of project execution require the mobilisation of heavy machinery on site, and are generally time-critical such as earth works. These activities need to be mutualised over the project through specific contracts.

## Resilience of the work schedule to remoteness

The essential aspect for achieving project success for remote projects is to ensure that work will not be interrupted by lack of material, spares or personnel, thus putting the entire site on stand-by while the missing item needs to be provided to site. Those interruptions have significant cost consequences.

Building resilience in the project schedule involve the following practices:

- Split the site in several work-fronts as independent as possible so that if one work-front is forced to stop due to a remoteness issue, the rest of the project continues and resources can be re-allocated instead of being on stand-by,
- Anticipate the realisation of all the infrastructure works required, to make sure they will be available when needed (they will generally be part of the early works of the project),
- Add sufficient systematic buffers in the schedule for the logistics and delivery of equipment and material, so as to ensure their required availability date on site, taking into account the logistics plan,
- Calibrate the schedule expected productivity on the basis of the data obtained from early works and other sources.

## Conclusion

Remoteness has a major impact on project execution. It will drive cost and a large part of the contracting strategy. Spare capacity in terms of quantities and schedule will impact cost and overall project schedule, and they need to be understood from the start when building the overall business plan of the project.

It is critical to develop a proper quantified understanding of the productivity and logistics issues faced at the site as early as possible during the project definition phase and at the start of execution. This requires proper site familiarisation and early testing at a smaller scale of construction operations.

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