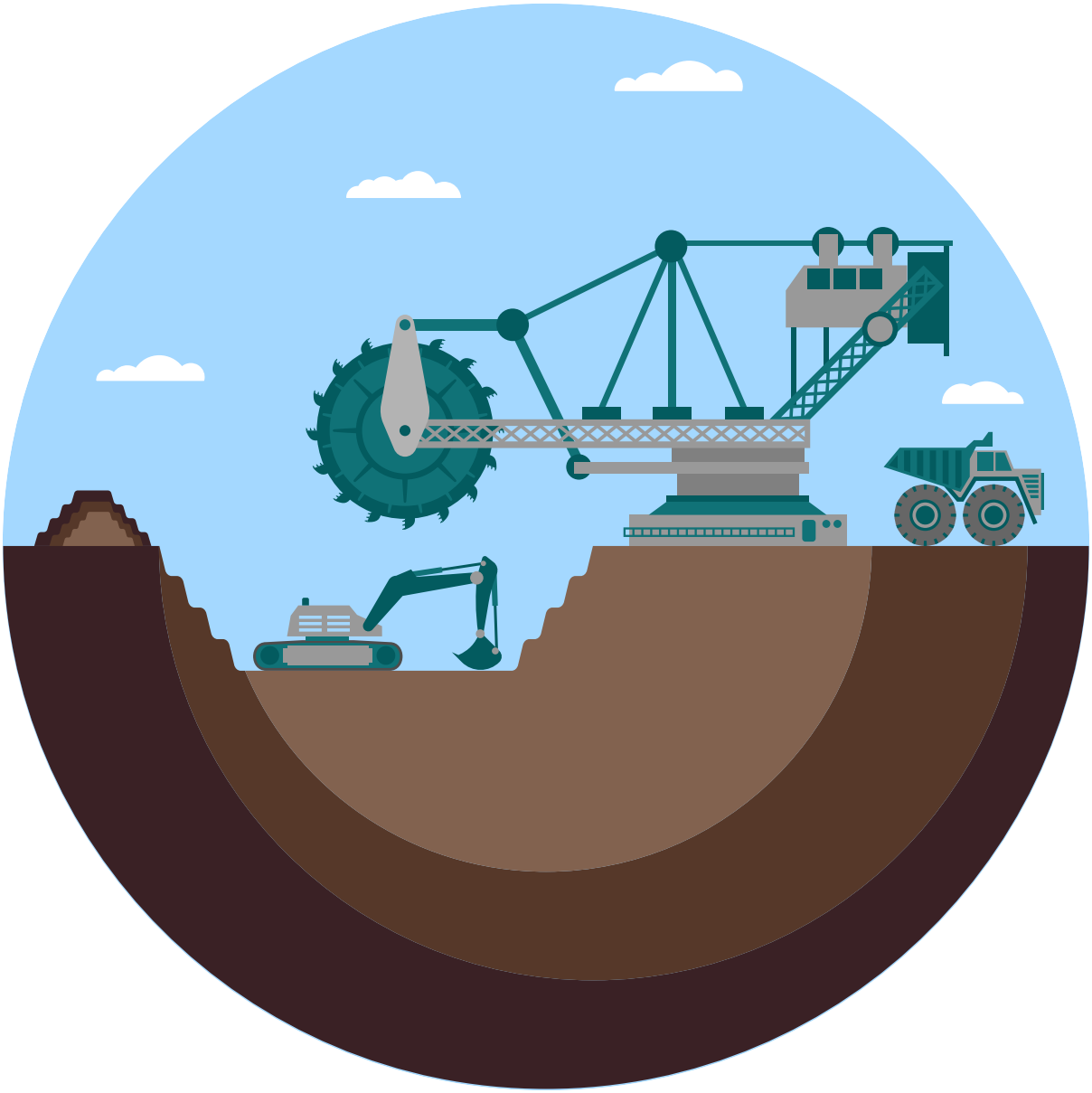
Deloitte.



Deloitte Construction – The Foundation of a Successful Project

Construction Project Management

Mining

About Deloitte Construction Group

Deloitte is a team of highly skilled professionals with significant experience in construction management.

Working in cooperation with experienced financial advisors and legal practitioners, over twenty engineers have a track record of successfully delivered projects both in the CIS.

In this brochure, we have highlighted key risks and issues our clients are facing when implementing their investment construction projects in mining industry.

Introduction

Before starting a mining project, you need to assess all risks, i.e. all uncertainties or conditions that may positively or negatively affect either one project goal or many of them, at all project stages — from developing a feasibility study to the ultimate launch of your plant.

Unlike public and building construction, mining projects require significantly larger investments and entail higher risks.

If you are ready to invest in the mining sector, we suggest that you consider the main risks that have to be assessed before investing in the project.

- **Price risks** — risks resulting from volatilities in mineral resources market.
- **Tax risks** — risks caused by irregularities in Russian tax legislation developments and uncertainties of the state tax policy (excise tariffs, export duties, VAT, income tax).
- **Legal risks** (risks of administrative barriers) — are the most complex ones and therefore the most dangerous for mineral developers.
- **Ecological risks** — constantly tightening environmental requirements. Increased environmental contributions and penalty payments result in decreased economic stability of mining enterprises.
-
-

Risk management is a very complex process that can be performed at all project stages:

- Pre-design stage
- Design stage
- Project implementation (construction)

Deloitte Construction – The Foundation of a Successful Project | Construction Project Management

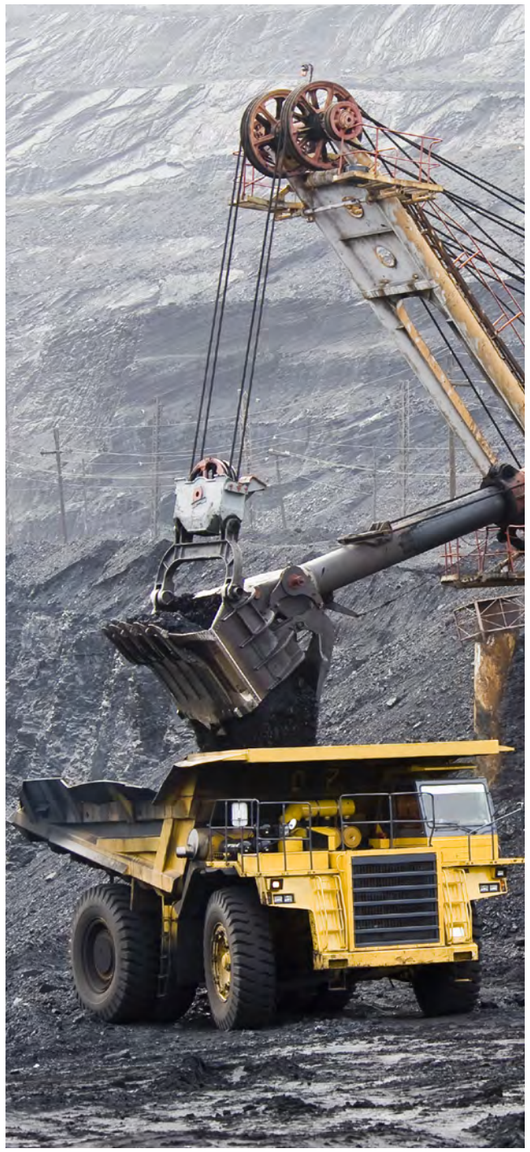
1. Building the project team

After assessing possible adverse events and having a clear intention to follow the goal set, i.e. to build a future-proof successful mining and refining facility we can proceed to project implementation.

Building a project team that will determine the management strategy and later implement it is an essential factor influencing successful project execution.

Before defining the organizational structure of the project management, you need to:

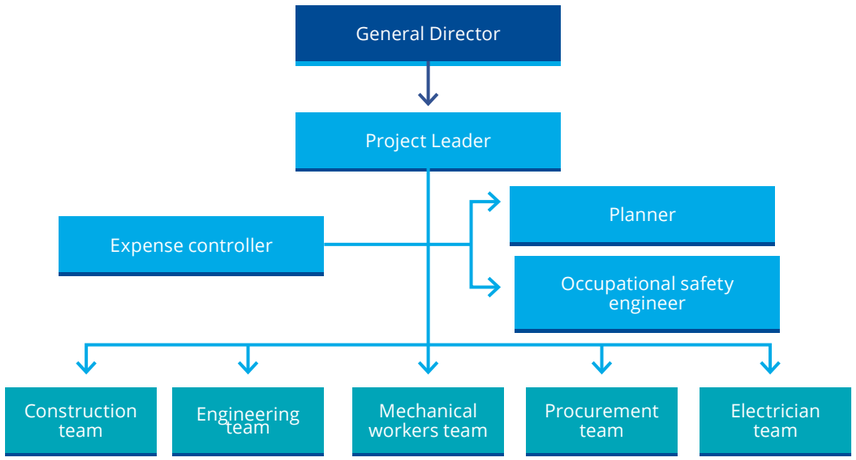
- **Analyze implemented projects global wide** — identify the reasons behind deviations between actual metrics and planned ones for various management systems;
- **Set clear and achievable goals;**
- **Balance conflicting requirements** — quality, time, and cost.



1. Building the project team

Following that, the management selects a management structure most suitable for the project. Below you can find descriptions of structure types.

- **Isolated** — an independent project team is working on the project. The project leader receives all authorities related to its implementation.



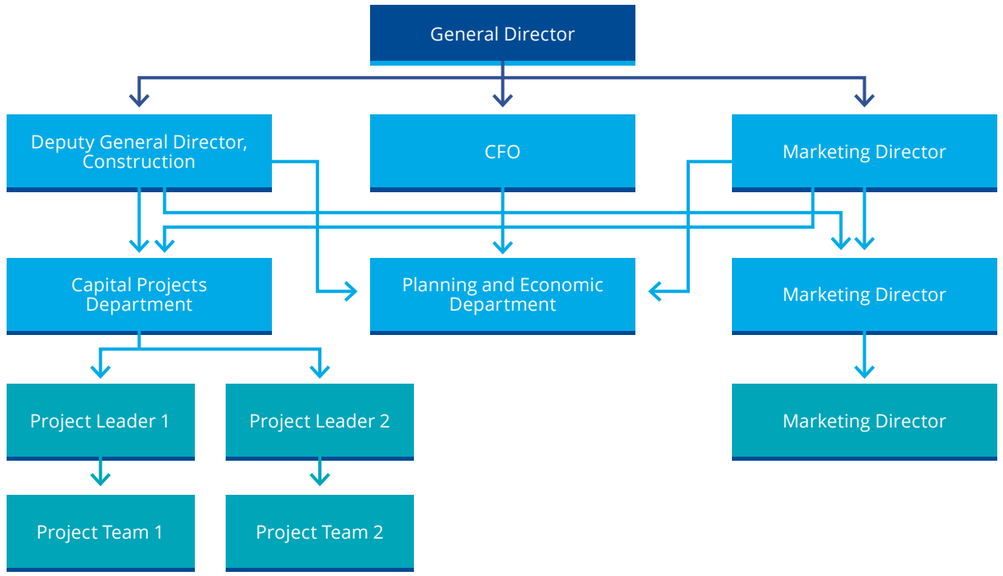
- **Matrix-like** — the project combines features of isolated and functional types: the project leader decides on what tasks should be performed and when, while functional managers decide what employees to assign to such tasks and what technologies to use.

Deloitte Construction – The Foundation of a Successful Project | Construction Project Management

At this stage, for a successful project implementation the project team should determine how they will achieve the balance, i.e. find the happy medium between the quality, time and cost triangle.

Further quality of project implementation depends on how well these three factors are balanced.

- **Functional** — the project is implemented within the existing functional subdivisions. Such organizational structure envisages that members of the project team can simultaneously work at several projects, which is inefficient in modern realities.



2. Managing pre-project and project works

In Russian practice, to ensure the project is completed in the shortest possible time, all too often design works and construction are performed simultaneously. In its turn, it raises the bar for design documentation since its quality directly affects the construction period, its price and quality.

Pre-design stage

Pre-project management should include:

- analysis of the primary documentation, its compliance with standards, review of geological map generation, verification of the approach feasibility and reserves calculation (resource evaluation), verification of the adequacy of technical studies (engineering investigations);
- control work, if necessary;
- development of technical requirements and examination of the project engineering;
- analysis of strategic risks;
- conclusion on data adequacy and recommendations on strategic risk mitigation for successful project implementation.

Design stage

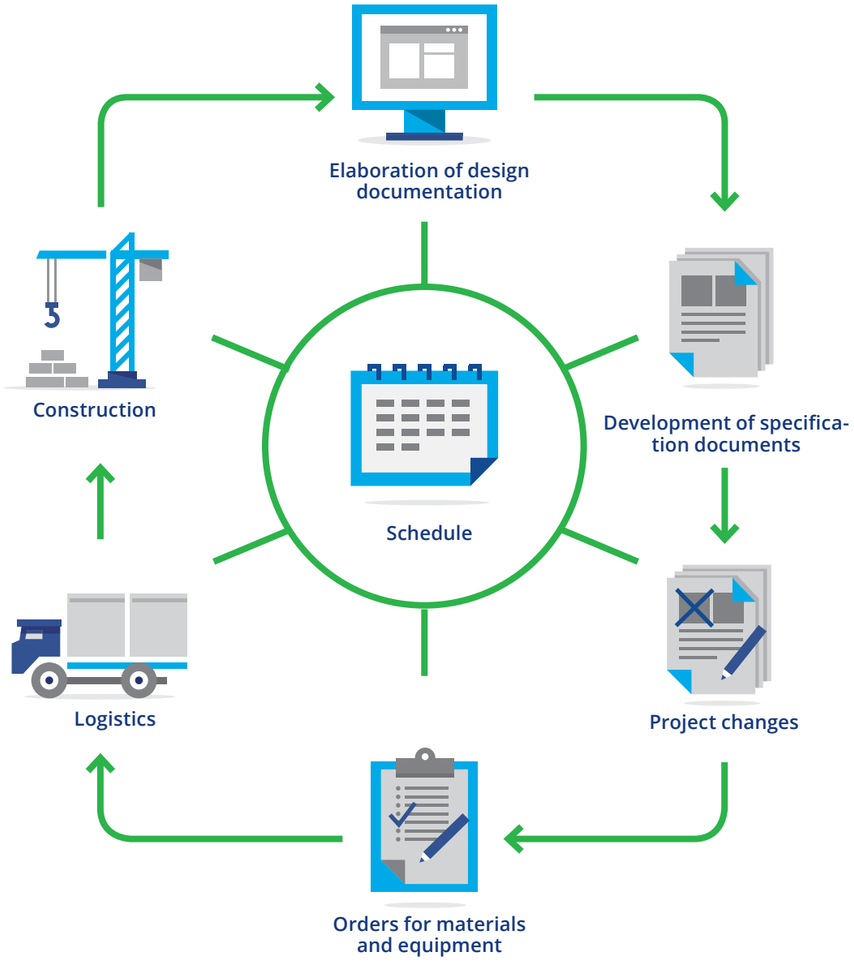
Project management should include:

- **Responsive change management**; design documentation and specification documents are constantly changing and require co-operation. To manage this process efficiently, there should in place an established procedure for introducing changes and ensuring timely communication to the related departments. Sometimes, the ultimate solution is to establish a project bureau on the construction site.
- **Innovative approach**: project design visualization using state-of-the-art CAD-tools (3D-design), i.e. teamwork empowered by 3D. Such automation enables every team member responsible for their own structure elements to exchange 3D models. Thanks to this instrument, the quality of design documents increases manifold.

Deloitte Construction – The Foundation of a Successful Project | Construction Project Management

3. Working out and operating the project schedule

The schedule is a prime tool to control project completion timeline. Obviously, applicability and usability of the schedule depend directly on the quality of its elaboration, content and adaptability in the course of construction.



Depending on the project elaboration and its stage, the following project schedules may be necessary:

- A **project milestones chart** is prepared where there is a shortage of information and it is hard to predict timeline and resources for certain works.
- **The main project schedule** is developed progressively as design and specification documents are elaborated.
- A **comprehensive project schedule** comprises several interconnected sections: design documentation and specification document scheduling, delivery schedules for materials and equipment, construction and installation works schedule, and commissioning schedule.

Elaboration of a high-quality schedule requires it to be filled with data on labour effort (man-hours of working men), level of non-labour (construction machinery and equipment) and financial resources (expenditures).

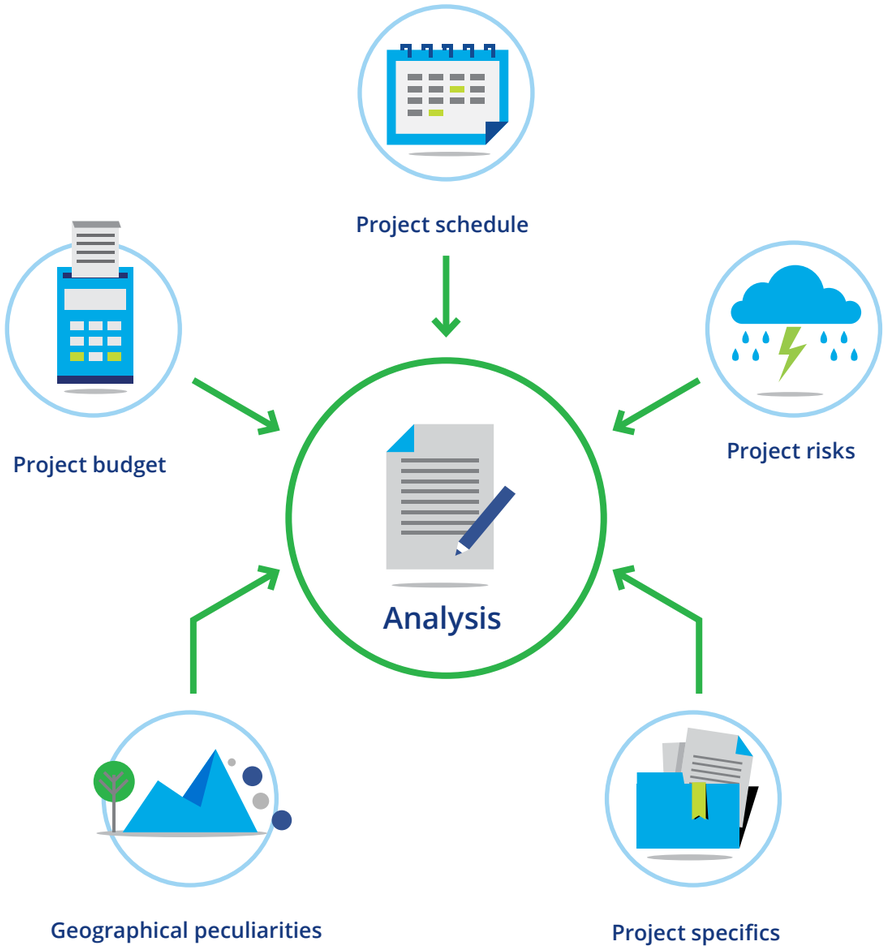
Design chart support effected in the course of construction includes:

- **updating project information** — actual start and completion dates as well as progress
- **entering adjustments** associated with changes in design documents, delivery dates, and quality and level of resources.

Deloitte Construction – The Foundation of a Successful Project | Construction Project Management

4. Supervising project logistics and procurement

Projects logistics and procurement control is an essential element for mining facilities, construction of which is usually carried out in conditions of complex transport accessibility.



Such analysis serves as a basis for the regulations governing control over the project procurement and includes:

- persons responsible for procurement and delivery of inventory items by project sections;
- persons responsible for quality control at all stages of the supply chain (visual examination, documentary control);
- types, sorts and number of vehicles involved in the logistics chain;
- a schedule for prioritization of consignments under the comprehensive project schedule;
- shipment dates, deliveries to the construction sites, container numbers etc.;
- creation of a consolidated request registry;
- supplier name, contract date, contractual delivery date;
- status (not ordered, ordered, not paid, paid, shipped, in delivery).

Deloitte Construction – The Foundation of a Successful Project | Construction Project Management

5. Maintaining control over the project budget

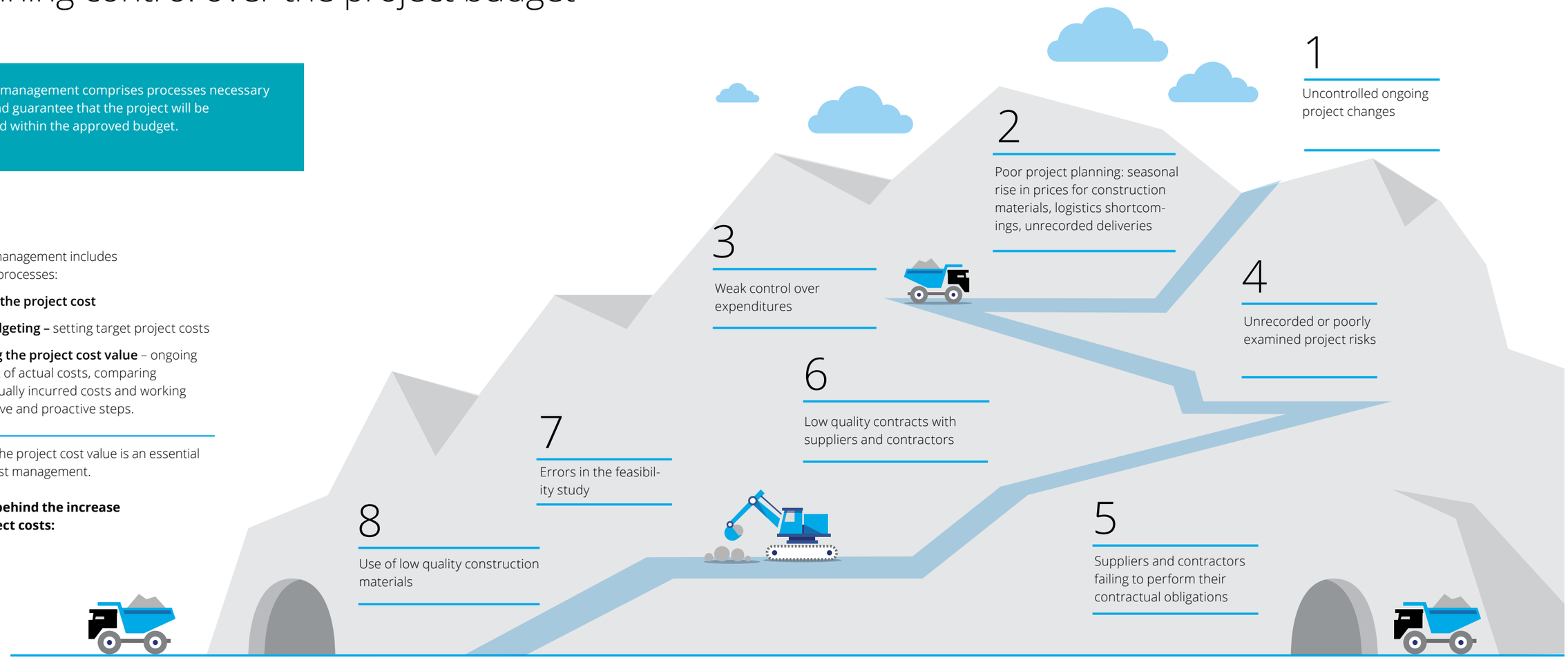
Project cost management comprises processes necessary to ensure and guarantee that the project will be implemented within the approved budget.

Project cost management includes the following processes:

- **estimating the project cost**
- **project budgeting –** setting target project costs
- **supervising the project cost value** – ongoing assessment of actual costs, comparing them to actually incurred costs and working out corrective and proactive steps.

Control over the project cost value is an essential element of cost management.

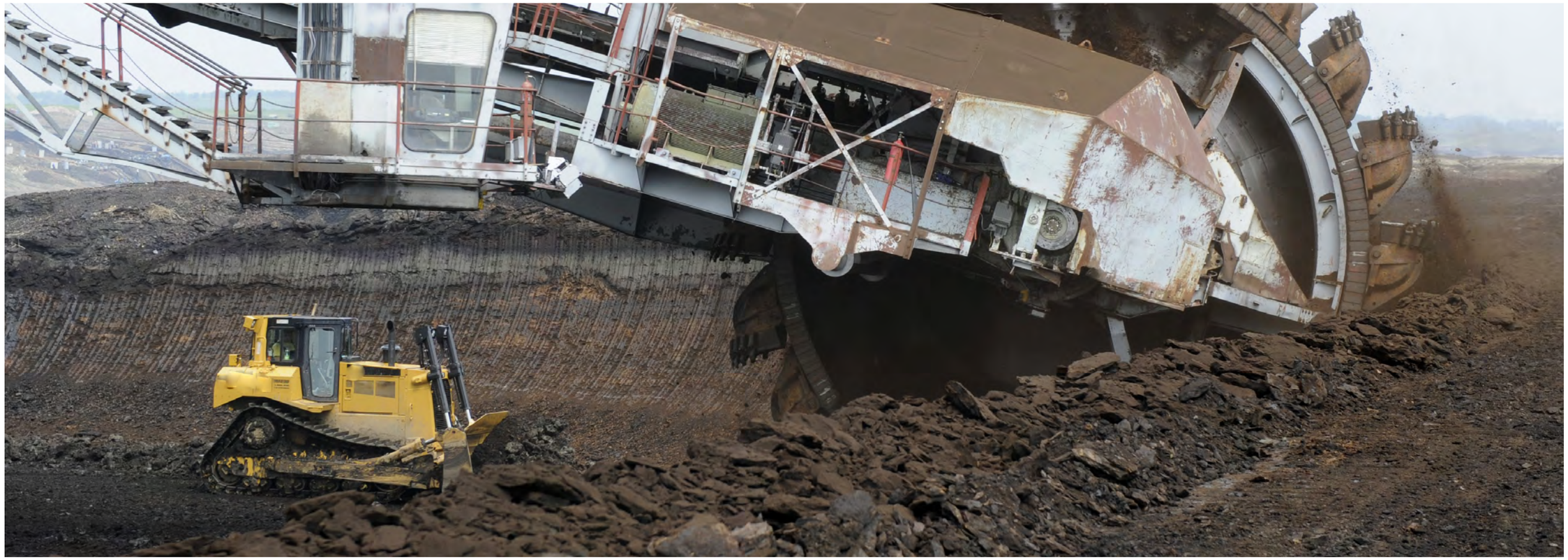
Key drivers behind the increase in total project costs:



- **Develop a unified project change request** form and maintain a change register to document all changes and extra work.
- **Find optimization opportunities within the existing budget:** create a register of expenditures that contributed to lowered construction cost which will help to decrease the cost of future extra work.
- When entering into contract relations with contractors, **set an identification list for construction materials and technologies** to prevent them being replaced with those of lower quality.
- **Establish conditions for using cheaper construction materials** that do not materially affect construction quality.
- **Hold an open bid** among suppliers for the projects.
- **Set a priority for contracting other suppliers** if those selected following the bid fail to perform their contractual obligations.
- When entering into contractual relations with suppliers and contractors, **set a System of appropriate penalty provisions** for non-performance of contractual obligations.
- **Perform high quality design supervision.**
- **Monitor performance of contractual obligations:** a well prepared contract gives assurance of successful project implementation. Ongoing monitoring of fulfillment of fundamental conditions and control over amendments introduced to contracts.

Deloitte Construction – The Foundation of a Successful Project | Construction Project Management

6. Reporting on a monthly basis



To ensure efficient monitoring, the management and key specialists have to elaborate the structure of project reports to document planned and actual metrics by work stages, timelines, costs and utilization of labour resources.

For this purpose, depending on the project stage
and needs, a report is generated on a:

- **monthly basis;**
- **weekly basis;**
- **daily basis.**

It enables a prompt response to emerging issues, mitigates risks of extra costs and makes it possible to:

- **identify the reasons behind the differences between actual and planned metrics;**
- **monitor deviations from the key metrics on an ongoing basis.**

Below you can find a few examples of key metric monitoring our team uses in monthly reporting:

- actual design completion rate (percent), by project sections;
- actual material availability rate (percent) of construction objects;
- actual performance of the logistics plan on delivering the necessary materials and equipment to the construction site;
- actual number of personnel on the construction site compared to the plan of construction organization;
- completion rate for key work types (reinforced concrete, steelwork, technologies, electricity supply, measuring equipment, automatic devices, start-up and commissioning)
- aligning open advances to actual works performed
- general matters requiring project management's attention
- project risks
- expected project completion date and estimated cost.

Contact

Marina Kostanian
Partner, Forensic and Construction Services in Caspian Region
Tel: +7 (727) 258 13 40
mkostanian@deloitte.kz

Rustam Mukhametshin
Director, Head of Forensic in Caspian Region
Tel: +7 (727) 258 13 40
rmukhametshin@deloitte.kz

Deloitte.

deloitte.kz