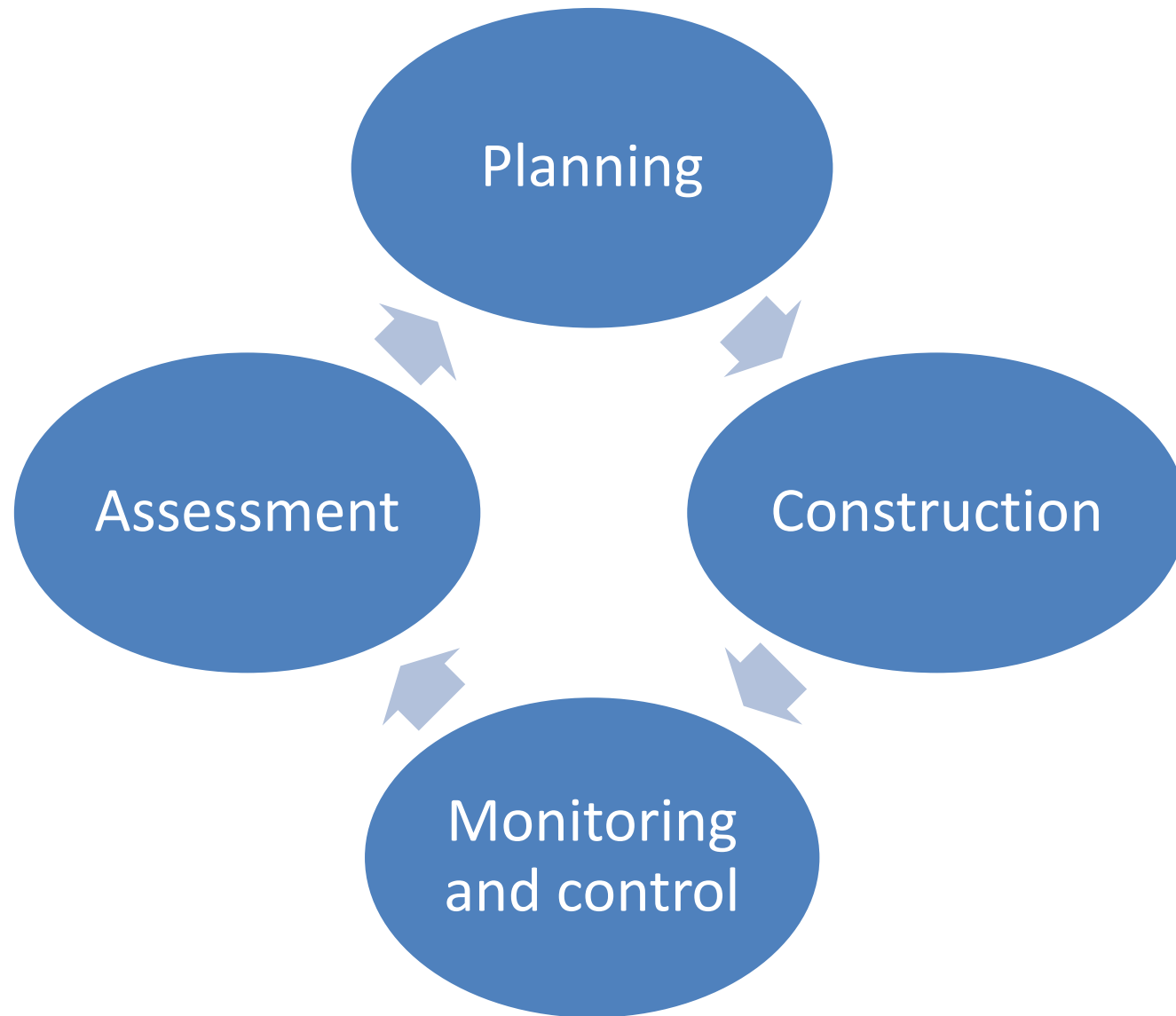


PROJECT PLANNING, MONITORING AND CONTROL

DELAY ANALYSIS





There will be difficulties to cope with during the construction stage
To guide this process we have the:

CONTRACT MASTER PROGRAMME

Signed by both the client and the contractor

The contractor has a contractual duty to complete the works on or
before the date of completion

If he fails he may suffer the deduction of liquidated and ascertained
damages from his contract payment



HOW TO CONTROL TIME

- The contractor's programme
- Milestones
- Early warning systems
- Progress recording



DELAY AND DISRUPTION

Definitions for delay and disruption:

Delay

Act or state of being late

Caused by events or circumstances that lead to failure to start or complete on time

1. Delays to progress: the programmed activity do not start or finish on time, but it does not necessarily affect the overall completion date of the project
2. Delays to contract completion: the project is not finished when agreed
 - The cause of the delay must be determined to consider an extension of time, or
 - It is liquidated and ascertained damages may be charged



DELAY AND DISRUPTION

Definitions for delay and disruption:

Disruption

Concerned with loss of efficiency due to lower productivity than expected or some interference with normal progress.

The contractor is involved in

- duplication of effort
- out of sequence working or
- Bringing subcontractors or other resources to site to do more work

It does not necessarily lead to a delay but will result in a claim for loss and expense under the contract due to the extra effort required to do the work.



TYPES OF DELAYS

Delay event

Something that happens that lead to a delay

Culpable delay

The delay is the fault of the contractor (non-excusable delay or contractor delay)

Non-culpable delay

The contractor is delayed through no fault of his own (excusable delay or employer delay)



DELAY AND DISRUPTION

Reasons for delay and disruption:

Where the client is at fault:

- Incomplete design at commencement on site
- Delays in the flow of design information
- Variations and changes in the scope of works
- Discrepancies in contract documents

Where the contractor is at fault:

- Poor quality of workmanship
- Inadequate planning
- Under resourcing of site operations
- Accidents and incidents on site

Where no one is at fault:

- Unforeseen physical conditions
- Strikes affecting site labour or the supply of materials
- Fire, explosion or any other accident
- Bad weather



EXTENSIONS OF TIME

It is expressly dealt within standard construction contracts through specific clauses:

- Extensions of time for specific events beyond the contractor's control
- Procedures for the contractor to follow when making an application for an extension of time
- Procedures for the contract administrator to follow when giving consideration to the contractor's application



TYPES OF DELAYS

Neutral delay

Caused by factors beyond the control of either of the contracting parties

At contractor's risk:

- Bad weather
- Late delivery of material
- Delay of subcontractors

At employer's risk:

- exceptionally bad weather
- discovery of ancient artefacts on the site
- strikes affecting site work, off-site manufacture or transport

Concurrent delay

Two or more delay events arise at the same time and at least one has been caused by the client and another by the contractor



DELAY AND DISRUPTION REGULATIONS

Joint Contracts Tribunal (JCT) or New Engineering Contracts (NEC)

- Use of appropriate contract and description

Society of Construction Law (SCL)

- Delay and Disruption Protocol (updated in 2016)
 - It is guidance to deal with main delay and disruption issues



DELAY ANALYSIS TECHNIQUES

As-planned vs As-built

Non-excusable delays are taken away from the total delay sum.

Example:

Total delay of works: 10 days

Non-excusable delays: 8 days

The client is only responsible for 2 days delay



DELAY ANALYSIS TECHNIQUES

Impacted As-planned

Each delay is added to the as-planned programme and shown how the project is being delayed (step by step).

Each delay has an impact on the total project.

Only impacts for excusable delays are considered.

Example:

Chronology	Activity	Delay type	Duration	Impact
1	2-4	Non-excusable	4 days	2 days
2	6-7	Excusable	3 days	1 day
3	7-8	Excusable	4 days	0 days
4	9-11	Non-excusable	3 days	1 day

The client will be responsible only for 1 day delay



DELAY ANALYSIS TECHNIQUES

As-planned But for

Only delays due to one party are included in the programme. The difference with the total delay at the end shows the responsibility of the other party.

Contractor's point of view: only consider non-excusable delays

Client's point of view: only consider excusable delays



DELAY ANALYSIS TECHNIQUES

Collapsed As-Built

Similar to the previous one, but instead of as-planned, we use the As-built network. The corresponding delays for one party are taken away. The resulting end of works is taken away from the actual.

Contractor's point of view: only consider excusable delays

Client's point of view: only consider non-excusable delays



DELAY ANALYSIS TECHNIQUES

“Window” analysis

The total project duration is divided into a number of time periods (windows or snapshots). Every period is analysed separately.

Delays in this period are introduced and actual end of works compared to scheduled.



DELAY ANALYSIS TECHNIQUES

Time Impact analysis

Similar to the previous one, but now it concentrates on a specific delay or delaying event

The schedule is updated at this delay period and the effect is analysed to establish a new completion date.

Effective technique as delays are analysed using real time