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Back to Basics – How to Plan your Works

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Introduction

Planning is an important function in any construction organisation which is often undervalued and the challenges under-estimated. Everyone has heard the old age *"fail to plan – plan to fail'"*, but improvising is a risky business.

The purpose of Project Planning is to establish, develop, and most importantly, communicate the overall strategy for the delivery of the Project in the most efficient and timely manner.

A failure of many Contractors is to leave the entire planning process to the allocated Project Planner. Creating the project delivery strategy should be a team effort, with all roles in the Project involved to ensure all the team's knowledge, experience and opinions are considered and incorporated.

The "*Planner*" brings all those ideas together and ensures ownership and accountability of the plan is as a Team, not an Individual.

Tools Available

Project Programmes (Gantt Charts) are the primary tools used to carry out the planning function in the Construction Industry. The software used will vary between organisations and is sometimes driven by the Client, however, the principles of planning are the same no matter what software package is used.

In addition, the planning function is not restricted to Gantt Charts. A variety of tools and documents can be used as a means to communicate the strategy of delivering a Project.

Aside from the traditional Gantt Chart, tools such as Line of Balance and Chainage Charts may be more suited to a particular Project type as the most suitable and efficient way of communicating the Plan. This, along with Logistical Plans, Method Statements and 3D modelling, are all ways and means of developing and communicating the Plan.

For the purposes of this article, we will focus on the preparation of the Gantt Chart, as this is the primary tool used for determining the overall Project sequencing and duration in line with the requirements of most Standard Forms of Contract.

Contract Compliance

The Programme needs to be consistent with the obligations imposed by the Contract. Most forms of Contract require, or at least allude to, some form of Programme to be utilised throughout the Project, but the content and/or method of presentation of a Programme is not usually prescribed. In our experience, the clauses relating to a Programme are often amended to incorporate some degree of Programme requirement.

Under the NEC Form of Contract, it states:

"*If a programme is not identified in the Contract Data, the Contractor submits a first programme to the Project Manager for acceptance within the period stated in the Contract Data.*"

Most of the JCT Suite of Contracts require the Contractor to commence on a defined date, "*Date of Possession*", and proceed regularly and diligently and complete on the Completion Date (for example, see SBC/Q 2016 Clause 2.4 or DB 2016 Clause 2.3). However, the Contractor is also required to produce a "*Master Programme*" under SBC/Q 2016 Clause 2.9.1.2 with or without a Critical Path. There is no requirement for a Master Programme under DB 2016.

FIDIC Clause 8.310 describes what the Contractor should provide in a Programme of Works stating:

"*(a) the order in which the Contractor intends to carry out the Works, including the anticipated timing of each stage of design (if any), Contractor's Documents, procurement, manufacture of Plant, delivery to Site, construction, erection and testing.*"

The Programme must also include a supporting report describing the methods which the Contractor is to adopt, and a reasonable estimate of the resources required.

Furthermore, whilst certain forms of JCT state simply that "*a programme*" needs to be submitted, they do not indicate the form, content or methodology. The FIDIC Sub-Contract and NEC, however, are clearly far more prescriptive. FIDIC (Annex F11) lists some 17 separate requirements for Programmes under Annex F11 and Clause 31 of the NEC also includes 17 separate requirements which are similar to the FIDIC Sub-Contract.

Our advice is to always check the Contract for amendments regarding Programmes, as amendments of this nature are becoming more and more prevalent.

Planning Levels

Programmes can be developed to varying levels of detail, ranging from low to high densities of activities. Tasks can be generic or simple task lines covering a multitude of processes, or they can be more detailed breaking the Project activities into the numerous tasks that are required to complete the Project depending upon the complexity of it. The Programmes are usually developed from the top down, but then maintained and updated from the bottom up.

The level of detail in a Programme can be categorised to tie in with, say, the RIBA Stages for planning work:

Level 1 – "*Executive Summary Programme"*: Frequently used at "*concept*" or *"feasibility"* stages and/or to summarise the Project for reports and other documents when a more detailed schedule is not required. Usually, a single page highlighting major Project activities, milestones and key deliverables for the whole Project (RIBA Stage 1).

Level 2 – "*Intermediate Programme*": Usually at Tender Stage and can develop into use as a "*Contract Programme*" once a Contractor is appointed. Typical duration is no longer than 8 weeks (RIBA Stages 2 to 3).

Level 3 – "*Construction Stage Programme*": Used to facilitate the on-site works and for the basis of Project Controls, developed in line with the technical design. Typical duration is no longer than 4 weeks (RIBA Stages 4 to 5).

Level 4 – "*Medium Term Lookahead*": Usually an extract from the Level 3 Construction Programme. Typically, a 3-month look-ahead (RIBA Stage 5).

Level 5 – "*Short Term Lookahead*": Usually owned by the Production Team rather than a Planner. Typically, a 4 week lookahead with focus on day-to-day planning (RIBA Stage 5).

There are no hard and fast rules on the Programme levels used. The Programme development should relate to the size and complexity of the Project.

Planning Principles

The starting point for a Programme from a Contractor's perspective is usually Tender Stage so there is a need to be competitive and innovative to have any chance of winning work. Even in partnering-type arrangements, Programmes will always be challenged. However, Programmes should be achievable under normal conditions and account for foreseeable risks and issues (for example, weather) either by specific mention or by inclusion in activity durations, to suit the Contract Conditions.

Programmes should also be innovative where applicable so that you have the best chance of being successful with a Tender, and/or delivering the work in the most efficient and profitable manner. A Programme should be in sufficient detail so that robust progress monitoring can be applied which enables assessment of the impacts of change, delay and disruption.

Activity durations can be established by **calculation**, using task output rates from various sources (output rate x quantity); **conceptually** by breaking a task down into its component parts; by **estimation** using the Planners/Project Team's own experiences; by **comparison** based on historical records from comparative Projects; and by **reference**, particularly with more specialist items of work, expert input from the supply chain is often obtained to inform the Programme.

Whatever the source, it is recommended that each activity's quantity, output rate, resource requirements and any risk allowance included is recorded. This will allow the Project Team to understand the output required on site to achieve each task within its duration allowance, and a means to measure the impact of change.

Linking all the activities together is the most important skill of the planning process. Understanding the interrelationships between the tasks and how to apply those relationships is the key to creating a robust and reliable Programme network, which is the key to identifying the critical/longest path.

Programme Basics

Further to the Programme level detail and activity durations, some simple rules should be applied in development of the Programme including, but not limited to:

- Have a clear structure and hierarchy – preferably split into Design, Procurement and Construction, then by building element, location, trade etc. depending on the Project type.

- Use "*Work Breakdown Numbering*"/Task ID's on all activities – these should be structured, to ease identification and CPA tracing; they must NEVER be changed (even in the case of error) or reused.

- Concise activity descriptions – these must be both concise and precise: for example, they should make sense without reference to the WBS.

- The Programme should be fully linked – all activities should have a start and a finish link (except the first and last activities).

- The Programme should be rescheduled – this is to identify the critical path, sub-paths and activity float.

- Minimise excess float – to demonstrate that the Programme has sufficient detail and the sequencing/logic is robust.

- Minimise use of constraint flags – these have the effect of overriding the pure logic of the network and thus must be used only when genuinely required. They are best limited to such events as the Project commencement and other contractual constraints such as key dates.

- Give each Programme a unique reference number, issue date and revision etc. – managing and recording the history of Programme development is important to assist with the change management processes.

- Use activity coding – this should be applied as appropriate. This allows the search, filter and display of certain activities to facilitate planning, control, audit, and most importantly, communication of the plan.

Programmes should be "*stress tested*" to ensure the Programme meets minimum standards to ensure the this is robust, achievable and is able to impact progress and change.

Programme Content

The structure of a Programme should be considered prior to starting, containing sections for Design, Procurement and Construction.

The most convenient format is a Gantt or Bar Chart which shows the planned duration, start and finish dates of the activities as well as their interdependencies. Each activity should have a unique task number and the maximum duration of an activity in the Programme may be specified in the Contract, depending on the complexity of the Project.

Activity duration will depend on the Programme level. For a construction level Programme, as a guide, no activity (other than a summary activity) should typically exceed 4 weeks in duration. However, ideally the duration present should be less than twice the reporting period which, if reporting weekly, would require durations not exceeding 2 weeks. Wherever possible, an activity should encompass not more than a single trade or operation. Activities should be linked together by the appropriate logic, such as finish to start, start to start and finish to finish.

To have certainty of the activity start dates in the Construction Programme, it is essential that the correct periods are allowed and monitored for the appointment of Consultants, production of design information, procurement of Sub-Contractors and lead-in times for the manufacture of materials and equipment etc.

Other considerations should be given in the development of the overall Programme such as: work patterns; holiday periods; contractual key/completion dates; winter working, Defined Provisional Sums etc.

Programme Presentation

Programme presentation can often be overlooked, but it is just as important as the content. If the Programme cannot be communicated effectively to be understood by all parties, then all that development effort has gone to waste, as nobody will understand it.

Depending on the level of the Programme produced and the complexity of the Project, sometimes Programmes can contain hundreds if not thousands of activities. Consideration should be given to how the Programme is presented and that will depend on the purpose of the Programme and to whom it is being presented.

A snapshot of Programme for the purposes of a progress report may only need to be a single page "*Level 1*" summary including the high-level summary bars depicting the entire Project timeline, whilst a "*Level 4*" 3-month lookahead Programme may cover several pages to include the level of detail required for the Production Team to manage the works.

All Programmes should be presented with a border that shows the Project name; title, Programme number, issue date and revision date as a minimum. Other optional information can be provided such as Programme status (draft/work-in-progress/for comment/final etc.); author, filters applied, descriptions, legend (code libraries) etc. As much information as possible should be included to inform the reader of its content and the purpose of the Programme.

Fundamentally, the Programme bars, activity descriptions and any other information should be easily readable, understandable and fit for purpose.

The Programme should be accompanied by supplementary information to assist with the communication process including tools such as logistic/phasing plans, traffic management plans, Information Required Schedules ("*IRS*"), Procurement Schedules and Method Statements.

Summary

To manage any construction or engineering Project successfully, it is necessary for the company undertaking the Project to have workable procedures in place that allow the management and control of Projects from the outset.

Within the established control procedures, a robust policy needs to be implemented on how a Construction Programme is to be formed, taking into consideration that change needs to be managed effectually, yet still allowing its active use on a day-to-day basis by the Project Team all in accordance with the Contract Documents.