

1: Risk Management in Construction | process of managing risk

Education Opportunities for Construction Project Management. The study of construction project management is a specialty field where you learn about management, planning, and organization in order to successfully complete projects in the construction industry.

Monitor site operations and modify risk assessment where necessary. Hold further task talk if method statement is changed. More detail on risk assessment and the risk assessment process. Risk Types in Construction Construction risk is greatest at the earliest stages of the project starting with the choice of procurement route. There are numerous procurement routes that construction projects use each with a different balance of risk either towards the client or the contractor. For example client-led design and build puts the weight of the risk on the client and the design phase whereas contractor finance or PFI puts the weight of risk firmly on the contractor through the design and construction phases. See Risk Transfer as a risk mitigation strategy. Client risks Client risks are around cost time and quality. Risk management considerations for the client may include: Feasibility risk - the decision to go ahead backed up by a robust business case , considering options and presenting the preferred solution. Design risk - deciding the level of control to keep over design and therefore the level of risk that remains with the client in terms of design. Funding risk - ensuring funds are available to pay the contractor and avoiding the risk of contractor insolvency. Commercial risk - the impact on income and profits if the new asset building is not delivered to time, cost or quality. Contractor risk For contractors the biggest risk is around the tender stage when commitments are made to a price and a timescale. Margins can be lost if the bill of quantities is not accurate. Subcontractors may not stand by their quotes and work may be more expensive than estimated if the choice of construction method turns out not to be suitable. Health and safety risk is managed through legislation directly and indirectly related to construction including the Construction Design and Management Regulations and the Construction Health, Safety and Welfare Regulations A health and safety plan is required for all but the smallest of project s and it is an important means of communication throughout the project. The Approved Code of Practice HSE gives guidance concerning the contents of the health and safety plan and explains the responsibilities of those who have duties under the regulations. Fire risk in construction projects Fire risk is always present on construction sites and the Construction Health, Safety and Welfare Regulations require contractors to take measures to prevent risk of injury from fire, provide and maintain fire-fighting equipment, and instruct people in the use of the equipment. Contracts provide for insurance of the works during construction including fire. A Joint Code of Practice, Fire Prevention on Construction sites specifies that a site fire safety plan must be developed by the principal contractor. Adherence to the code is a contract condition in some standard forms of contract used in the construction industry.

2: Construction Cost Control Procedures | www.enganchecubano.com

Planning, scheduling is an important part of the construction management. Planning and scheduling of construction activities helps engineers to complete the project in time and within the budget.

Chris Henderson, the author of "Project Management for Construction," cites an old definition of a construction project as "any collection of vaguely related activities that are 90 percent complete, over budget and late. Not all architects and engineers are good at cost estimation. For this reason, it pays to hire a construction manager or management firm with expertise in time and cost estimation early on in any project of consequence. The construction manager should review preliminary plans as they are submitted, and where her cost estimates reveal discrepancies, the plans should be revised accordingly. Detailed Estimates Once final plans are submitted, the construction manager and accountant should review the plans and make detailed estimates for labor, materials and construction overhead. Time estimates also should be made in some detail, because cost is a function of time. Projects that fall behind schedule invariably go over budget. Construction Cost Roadmaps The project manager, assisted by the construction accountant, prepares a schedule with detailed cash flow estimates based on the final construction plan. This document becomes the project roadmap. Progress on any activity then can be compared with the project schedule. So long as costs and timelines match estimates, the project is under control financially. Overruns in cost categories or deviations in the schedule indicate potential problems. Often, an early, detailed examination of the discrepancies reveals how they can be overcome. Forecasting for Cost Control Traditional financial accounting is historical -- it tells you what has happened. In construction, in order to control costs, procedures must be in place that also forecast future costs. For this reason, it becomes important to keep track of completion schedules through a series of intermediate milestones. It is not enough to wait until a project segment is completed. For example, the materials, time and labor estimates for window installation will have several progress milestones. Once the first milestone is reached, the cost constituents -- time, materials, labor and overhead -- can be determined. Where they exceed estimates, a forecast of successive milestones can be made, and steps initiated to reverse the conditions that caused the overage in the windows installation schedule. Alternatively, the project manager can look for ways to recover the overage in other budgeted schedules.

3: Construction planning - Wikiversity

*Planning for control in the construction industry [Derek H. T Walker] on www.enganchecubano.com *FREE* shipping on qualifying offers.*

Search Cost Control and Cost Planning in Construction Industry Introduction Profit is always the main consideration for a company to make decision and it is the main reason to run a project. But how we can gain profit by running project? A proper planning is always help to reduce the risk on running project. There are a lot of tools or methods offer by project management, cost planning and control is a very important tool for project management. A good cost planning is because it can help on forecasting the expenses that need to spend for the project. And cost control will minimize the wastage during execution of project. This report will emphasize the objectives, benefits, methods and other matters on construction cost planning and cost control. Cost Planning Cost planning normally will conduct in the prior stages of construction project. After the owner has allocated the budget, cost planning will determine whether the project will over budget. If yes, the project is not feasible in its current state and should be re-plan or re-schedule to reduce costs. The general advantages of cost planning include: The tender sum is more likely equate with the approximate estimates. Reduce the unnecessary quantities being required? Cost effectiveness and a value for money design are more likely to be achieved? A balanced distribution of expenditure is likely to produce a more rational design? Cost considerations are more likely to be taken into account because of the greater involvement of the quantity surveyor during design process. This will result in the BQ preparation becoming easier, since the quantity surveyor will be more familiar with the project and have a greater understanding of what the designer is attempting to achieve.? The amount of pretender analysis by the architect and quantity surveyor should enable more decisions to be taken earlier, resulting in a smoother running of the project on site. Cost planning provides a basis for comparing different projects. The aims of cost planning are as follows: Ensure that the client obtain good value for money. Rational realistic distribution of money spent on the design. No need to spend the total budget offered by client. Cost Control Cost control in construction stage is the key to take effective way for construction. Cost control is a process that should be continued been implement throughout the whole construction period. The purpose of cost control: To achieve a balanced design expenditure between the various elements of the buildings. To provide the client with a value for money project. A proper cost control is serving: Easier to control or monitoring the remaining job. To maximise the value of money for the project. To maximise the feature of the element that we purchase with the minimum costs. Conclusion There are a lot of things that we might take it under consideration when running a project, e. Profit is always the main consideration of a company, and we are able to maximize the profit through the proper cost planning and cost control. By the cost planning, we are able to find out the problem of manpower and scheduling arrangement if any. It is because; the cost planning will show a peak time of cost when other time is fairly low. The Cost Plan enables you to allow for any issues identified during the preliminary stages that may also have a cost impact during construction, thereby saving you the unnecessary additional costs of engineering and final drawings, in the event that your design comes in way over your budget. Cost control can minimized the wastage during the construction period. Cost control is guaranteed to meet contract requirements such as quality, duration, subject to costs incurred in the process of project implementation through effective planning, control and coordination of activities to achieve cost objectives. So cost planning and cost control was strongly recommended to apply for the project.

4: Free Civil Engineering Softwares Tutorials, Ebooks and Setups: Construction Planning & Scheduling

The construction industry is notorious for its unsophisticated strategic planning procedures, a fact swayed by the sheer difficulty in making accurate predictions in a market wrought with much uncertainty, a fact influenced by a hypercompetitive industry where serious planning is considered expendable overhead, where tradition determines decisions, where middle and senior management are unaware of developments in planning.

The construction project manager specifies objectives and plans, maximizes resource efficiency, implements various operations, and develops communication and mechanisms, among others. For instance, construction projects are required to reach an objective at a given schedule, budget and quality. The Top 5 In the same way, CPM also benefits in utilizing applications and tools that automate administration tasks, simplify estimating and billing, facilitate planning and scheduling, manage workload assignments, centralize document management, and promote real-time communication and issues resolution. Below are five PM software that are valuable in completing construction projects. Construction Project Management Solution Checklist Buying new project management software is not as easy as walking into a supermarket and picking a product. You need a checklist to guide you. Besides you must have a good reason to purchase such an expensive system for a project. Will the system make work easier? Will the platform help with real-time project management? Is the software transparent? Will the software improve tracking and accountability? Is the software reputable for accuracy? Can the software be integrated with other products? Does the software offer solution to industry problems? Does the software offer modernization for my business or project? How many licenses and fees will be required in running the software? Does the provider offer technical support for the system? Is training offered by the provider? Is the software intended to be used on multiple computers? Can the system be mobile accessed? Will a merger transition compromise my data security? Do you need a web based or on-site solution? Each question on the checklist is crucial to finding your dream project management tool for the project ahead. Conclusion Different groups in the construction industry predict a positive growth in , especially in residential and commercial construction, as national and overall world economy gets better. For companies in this particular industry, it is great news for business. It is also high time to review if present PM practices, applications and tools are ready to handle the new projects slated to come along.

5: Project Management in the Construction Industry

Cost Control Cost control in construction stage is the key to take effective way for construction. Cost control is a process that should be continued been implement throughout the whole construction period.

Closeout The process balances the key project constraints and provides a tool for making decisions throughout the project based on stakeholder values, performance metrics, established procedures and project goals. Effective project management includes strategies, tactics, and tools for managing the design and construction delivery processes and for controlling key factors to ensure the client receives a facility that matches their expectations and functions as it is intended to function. Improvements in building quality directly contribute to reduced operational costs and increased satisfaction for all of the stakeholders. Successful project delivery requires the implementation of management systems that will control changes in the key factors of scope, schedule, budget, resources, and risk to optimize quality and, therefore, the investment. This section offers guidance for the entire team to successfully and effectively optimize the quality of a high-performance building project. It is critical to establish the qualities of the project that are necessary to satisfy client and end user needs and expectations, once it is delivered and in use. Value for the money in construction requires completing a project on time, on budget and to a level of functionality that meets the determined needs. A well-programmed project will continue to provide value and meet user needs throughout its lifetime and will contribute positively to the environment in which it is located with a wide range of social and economic benefits. Early investment in planning , programming , and design can help deliver these benefits and avoid unnecessary costs and delays. Additionally, the processes can be streamlined based on technologies and efficiencies not previously available. The responsibility for delivering a project as planned rests with the entire team. When evaluating options, the whole-life value should be considered and not limited to the short term initial investment. Factors that affect the longer term costs of a facility, such as maintainability, useful service life, and resource consumption should be integrated into the decision matrix. Project Delivery Teams â€”How to assemble and effectively manage the project team. Risk Management â€”Provides details on how risk analysis is used as an organized method of identifying and measuring risk. Building Commissioning â€”Provides an overview of commissioning drivers, benefits, goals, and principles for improving building quality. See our resource guide for more information on best practices. It also provides guidance on managing the team during the planning, design, construction, and occupancy phases of a project. This section of the WBDG is applicable to federal projects, other public institutions, and private sector projects with adaptation for organization specific and local standards of professional practices. Initiation and Planning Project inception and preliminary planning require: There are tools available that help define the goals and objectives for the project that let all stakeholders have a voice in making the project successful. The risks associated with making mistakes in this part of the process are great, since their impact will be felt across the project development process and in the final project results. For more information, see links below in the Additiona Resources section. Determining appropriate goals and objectives at the beginning of the process, during a visioning session, and measuring their implementation over the life cycle of building and construction has been proven to increase overall building quality and reduce project costs and timing to delivery. Delivery Methods There are many approaches to achieve successful project design and construction. The selection of a delivery method will in turn influence the team composition, schedule, budget, and management plans to be followed throughout the process. Scope management sets the boundaries for the project and is the foundation on which the other project elements are built. From the beginning it helps identify the work tasks and their requirements for completion. A Project Management Plan PMP documents key management and oversight tasks and is updated throughout the project as changes occur. It also provides a vehicle for including efficiencies in the design and construction phases of all buildings. It will also serve as the basis for completed construction documents and outline the commissioning plan for finished execution. Using Building Information Modeling BIM Building Information Modeling BIM is the process of generating and managing building data during its life cycle Typically it uses three-dimensional, real-time, dynamic building modeling

software to increase productivity in building design and construction. The process produces the Building Information Model also abbreviated BIM , which encompasses building geometry, spatial relationships, geographic information, and the quantities and properties of building components. Utilizing BIM has the potential to save project time and cost and increase overall productivity of construction and delivery of building projects with less rework, design, and construction errors. The advantages of BIM over the traditional design and construction process are significant source: Construction Delivery Systems, Lorence H. BIM single data entry into one model avoids the opportunity for inconsistency and error of repeated input of identical data in multiple media. Data once entered or altered is available in the single current model available to all. BIM design efficiency reduces the cost of design and preparing contract documents. BIM base information is uniform and shared with all participants. BIM three dimensionality and software identify physical conflicts between elements reducing significant construction delay, and extraordinary additional expense. Where modifications are suggested, the impact of the proposed changes are immediately apparent, subject to evaluation and reconsideration. BIM three dimensionality assists in sequencing and constructability reviews. Confidence in shop drawing and fabrication accuracy is improved by BIM because the model can provide construction details and fabrication information. More materials can be fabricated more economically off site under optimal conditions due to the confidence in the accuracy of the fabrication. BIM can link information to quantify materials, size and area estimates, productivity, material costs and related cost information. Overall, the BIM digital model becomes a rehearsal of construction and can help identify conflicts and their resolution before actual construction dollars are spent. Execution Construction Stage Management This stage should include all of the components involved with construction and documentation for the project. The team members involved in this phase will be responsible for Requests for Information RFIs , Change order management, conflict resolution, inspections, submittal reviews, adhering to schedules and coordinating timely payments. The budget should anticipate all program requirements from planning, programming and design to bidding, construction, turnover, and post occupancy. Once established and agreed, the initial project budget should not change, unless amended by approved changes. Budget Management - During the preconstruction process, the details of the program and design are developed. When the design or program starts to grow or "creep", the project team must work together to bring the design and estimated cost back in line with the established budget. Value analysis, alternate procurement strategies, cost-benefit analysis, program adaptation and life-cycle costing are a just a few examples of the tools available to the team to help manage design to budget. Cost Control - Cost control is a process requiring continual and systematic cost management as well as monitoring to compare actual costs incurred against targeted budget line item numbers. Key elements to controlling cost are rooted in, among others: Managing change to occur in the beginning of the project as much as possible; A thorough understanding and thoughtful buyout of the scope of the project; Appropriate assignment of risk and managing risk transfer; Thorough and thoughtful planning for the execution of the work; Establishing expectations and holding team members accountable for their respective responsibilities and performance; Respecting roles and working together to solve issues as they arise. Schedule Management A project schedule establishes a timeline for delivering the project and most importantly, the project activities and their respective inter-relationships. Avoiding missing deadlines for delivery of key project components is a key objective of schedule management. Schedule management interfaces directly with scope, cost, and quality optimization and team member roles and activities must be defined, coordinated, and continually monitored. It is the goal of every project manager to look for efficiencies in all of these areas as a project progresses. Project Management Software There are many software options available to assist in the management of a project or program of work. A key point in making a selection is ease of use-some programs are designed to handle very complex situations while others are more straightforward and user-friendly. Keeping in mind the end-user and information required to be generated will help in selecting a system that is scaled appropriately for the project at hand. Generally, all will require a Work Breakdown Structure WBS to be created within the system, breaking down the entire project or program into manageable pieces. Links to software tools available are provided in the Resources section below. Monitoring and Control Delivering and Measuring Building Quality Good design is derived from a complex and creative

process encompassing a wide range of activities, elements and attributes. A standard for measuring building quality has been created by the Construction Industry Council CIC and it measures the key attributes that constitute good design and produces high performance buildings. Functionality, Build Quality and Impact. Functionality is concerned with the arrangement, quality and inter-relationships of space and the way in which the building is used. Build Quality relates to the engineering performance of a building which includes structural stability and the integration and robustness of systems, finishes and fittings. DQI also encompasses the wider effect the design may have on the art of building and architecture. It is the interplay between all of these factors that creates a truly high performance building. The overlapping nature is demonstrated below: Functionality, Build Quality, and Impact. Build Quality relates to the engineering performance of a building which includes structural stability and the integration and robustness of systems, finishes, and fittings. Quality Optimization Quality optimization starts with matching expectations about functionality with budget and scope during planning and design reviews and continues through construction delivery with a program of inspections, tests, and certifications. Having a process implemented at the beginning of the project will help define the goals as well as provide a continuous measurement system over time to make sure the objectives are being met. From visioning to post occupancy, a system like the Design Quality Indicator DQI helps eliminate errors, reduces cost, and improves overall building quality. Closeout Building Commissioning Building commissioning Cx is quality assurance process for achieving, verifying, and documenting that the performance of facility systems and assemblies meet the defined objectives and criteria for the project.

6: Cost Control and Cost Planning in Construction Industry

Cost control in building design and construction A development budget study is undertaken to determine the total costs and returns expected from the project. A cost plan is prepared to include all construction costs, all other items of project cost including professional fees and contingency.

Therefore, for many years, efforts have been made to plan, direct, and control the numerous project activities to obtain optimum project performance. Because every construction project is a unique undertaking, project managers must plan and schedule their work utilizing their experience with similar projects and applying their judgment to the particular conditions of the current project. Until just a few years ago, there was no generally accepted formal procedure to aid in the management of construction projects. Each project manager had a different system, which usually included the use of the Gantt chart, or bar chart. The bar chart was, and still is, quite useful for illustrating the various items of work, their estimated time durations, and their positions in the work schedule as of the report date represented by the bar chart. A sample bar chart for a construction project is shown in Fig The development of the critical path method CPM in the late s provided the basis for a more formal and systematic approach to project management. These methods have been applied with notable success to project management in the construction industry and several other industries, when applied earnestly as dynamic management tools. Planning and Scheduling Planning for construction projects involves the logical analysis of a project, its requirements, and the plan or plans for its execution. This will also include consideration of the existing constraints and available resources that will affect the execution of the project. It is here that the construction planner must actually build the project on paper. However, to mechanical contractors, this would be totally inadequate because they will need a more detailed breakdown of their activities in order to schedule their work. Therefore, the level of activity detail required depends on the needs of the user of the plan, and only the user can determine his or her needs after gaining experience in the use of critical path methods. Once the activities have been determined, they must be arranged into a working plan in the network logic diagram. Starting with an initial activity in the project, one can apply known constraints and reason that all remaining activities must fall into one of three categories: They must precede the activity in question. They must follow the activity in question. They can be performed concurrently with the activity in question. The remaining planning function is the estimation of the time durations for each activity shown on the logic diagram. The estimation of activity times is always a tough task for the beginner in construction because it requires a working knowledge of the production capabilities of the various crafts in the industry, which can only be acquired through many observations of actual construction work. Therefore, the beginner will have to rely on the advice of superiors for obtaining time estimates for work schedules. Scheduling of construction projects involves the determination of the timing of each work item, activity, in a project within the overall time span of the project. The planning and scheduling of construction projects using critical path methods have been discussed as two separate processes. Although the tasks performed are different, the planning and scheduling processes normally overlap. The ultimate objective of the project manager is to develop a working plan with a schedule that meets the completion date requirements for the project. This requires an interactive process of planning and replanning, and scheduling and rescheduling, until a satisfactory working plan is obtained Posted by Engr. Masaud Akhter at 8:

7: Top 5 Construction Project Management Software

Planning is the first step of construction project management philosophy of planning, organizing and controlling the execution of the projects. Construction project planning and project scheduling is two separate and distinct function of the project management.

Share on Facebook Businesses of all sizes sometimes find it necessary to manage construction projects on their own account or as part of larger contracts. Even smaller businesses may require an expansion of existing facilities or a new building. Planning for such construction projects and controlling costs and schedules are often challenging and require a thorough understanding of construction management techniques to bring the project to a successful conclusion. A work breakdown structure reduces complexity by breaking down the work to be done into individual tasks that are the responsibility of a particular employee. PERT charts put the tasks into sequence to establish what has to be completed before other tasks can start. Gantt charts are horizontal bar charts, with each bar representing the duration of a project; these give an overview of how the project has to proceed. Applying these techniques to construction projects allows you to reserve the required resources and assign responsibilities to ensure the smooth functioning of project management. Cost Control Construction project management requires cost control. Your planning activities have helped you identify the tasks that have to be completed and assign corresponding work. Cost control starts with distributing the total cost to the tasks and establishing reporting procedures to track costs as your company incurs them. You can achieve close cost control with signature rules for purchase orders and payments. If you have to sign all purchase orders, you will know what costs the project is generating. If your signature is required for payments, you have control over booking costs to the project. Schedule Control Controlling the schedule for construction projects is critical because tasks are mutually interdependent and delays can increase costs. Your planning has established the overall schedule and specifies when particular tasks must be completed. A good schedule control technique is to establish milestones that are easily observed and verified. Another technique is to use outside events like permits to check on progress. If you have scheduled a milestone like the raising of the building structure, you can go to the site on that day to verify whether the project team has met the milestone. If you know that the project requires a building permit at a certain date, you can check whether the permit has been issued. Quality Control An important function for construction projects is to control the quality of the materials and the work because it affect the value of the structure you are building. Quality control has three parts. You have to identify the level of quality you want, ensure that the purchase orders specify the quality and examine the finished product to make sure you received what you ordered. When you assign responsibility for a task in the planning stage, you also have to assign responsibility for the quality and for the required documentation. For each item, the documentation has to include the specified level of quality, the corresponding order and the resulting test or inspection report.

8: Project Management Techniques in Planning & Controlling Construction Projects | Your Business

the Design and Construction Industry Design & Construction Institute of Nova Scotia © February 4, Game Plan planning, control, monitoring, and review of.

Construction planning Construction engineers use various methods of planning a project. Most common is Microsoft Project and Primavera. The Construction Planning Engineers visualize the sequence of Executing a project and present them in a graphical or table , Presentable format. Gantt and PERT charts are methods used in the programming, planning and control of construction projects. These methods and applications can be used as an efficient and powerful project management tool system. It is a basic and effective method to analyze the construction tasks involved in completing a construction project, especially the time needed to complete each task, and identifying the minimum time needed to complete the total project. In doing so, decisions can be made instead of it making decisions for the user. The illustration of a PERT chart is a display of interconnected events conventionally represented as numbered circles or squares. These are linked by arrows which either precede or succeed each activity. PERT charts are usually drawn on ruled paper with the horizontal axis indicating time period divisions in days, weeks, months, and so on. Although it is possible to draw a PERT chart for an entire project, the usual practice is to break the plans into smaller, more meaningful parts. This is very helpful if the chart has to be redrawn for any reason, such as skipped or incorrectly estimated tasks. On the Pert chart design these activity boxes can also split and run simultaneously in order to illustrate other areas of work within a project. These boxes contain start and finish dates, durations and earliest and latest start and finish dates. The advantage of this technique as a project management tool can be seen back in the times when computers were not so common. It meant that activities could be programmed on projects of differing magnitude and complexity involving a large number of tasks and dependencies, hence PERT is and was intended for very large-scale, one-time, complex, non-routine projects. It does, however incorporate uncertainty in the sense that it is possible to plan a construction project not knowing precisely the details and durations of all the activities involved such as bricklaying and the installation of windows. In this respect it is seen as an event-oriented technique rather than start- and completion-oriented. However PERT can dictate the critical path of a project which is the longest possible continuous pathway taken from the initial event to the terminal event. It also determines the total calendar time required for the project; and, therefore, any time delays along the critical path will delay the reaching of the terminal event by at least the same amount. Also Lead and Lag Time can be taken into account. These are the times by which a predecessor or successor event must be elapsed in order to allow a sufficient time for the following PERT event to start. Also, a project is to determine the tasks that the project requires and the order in which they must be completed. The order may be easy to record for some tasks i. Additionally, the time estimates usually reflect the normal, non-rushed time. Many times, the time required to execute the task can be reduced for an additional cost or a reduction in the quality. In a CPM chart, the critical path is indicated. A critical path consists that set of dependent tasks each dependent on the preceding one which together take the longest time to complete. Although it is not normally done, a CPM chart can define multiple, equally critical paths. Tasks which fall on the critical path should be noted in some way, so that they may be given special attention. One way is to draw critical path tasks with a double line instead of a single line. Tasks which are on the critical path must receive attention by both the project manager and the personnel assigned to them. The critical path for any given method may shift as the project progresses and this can happen when tasks are completed either behind or ahead of schedule. This causes other tasks which may still be on schedule to fall on the new critical path. In this respect, the Gantt chart evolved with the Critical Path method. A Gantt chart is a popular type of bar chart that illustrates a project programme. Gantt charts illustrate the start and finish dates of the activities and summary elements of a construction project. The initial format of the chart was developed by Mr. Henry Gantt in The method was seen at the time as a revolutionary tool and was overlooked by the PERT method. By the s, the PC eased the implementation and editing of elaborate Gantt charts or programmes. Gantt charts are now used in software applications such as MS Project. This software was primarily intended for project managers

and construction planners. Nowadays, the Gantt chart has become a common technique for representing the phases and activities of a project work breakdown structure, so they can be understood by site management and subcontractors. On a Gantt chart activity elements and summary elements comprise the work breakdown structure of the project such as excavation and concrete pouring. A Gantt chart used in construction can be a compilation of activities shown in a bar format. These bars can be linked together to show the sequence of activities. The longest sequence of activities is known as the critical path of the programme as described above. The advantage of the Gantt chart over a PERT chart means that a series of activities can be reviewed during a project and also can be used to show current status using percent-complete shadings in a vertical format. A Gantt chart programme can list all the tasks to be undertaken with start and finish dates and durations. Each activity can also have resources and costs assigned to them. The advantage of this means that the progress updating of the programme can be evaluated in terms of value undertaken and work complete on-site. It can be seen that a Gantt chart has a distinct advantage over a PERT chart in respect that it is easier to be visually represented by showing activity bars instead of activity shapes which can be misleading to the reader. Also a Gantt chart can be represented in a graphical format indicating resources and the critical path. The most commonly used type in the Irish Construction Industry is the Gantt chart which is tried and tested using computer software applications such as MS Project. At tender stage the Contractor is required to produce the following: Tender Programme – Fully logic linked and rescheduled to identify the Critical Path, any float and earliest Completion Date. Allowances for Inclement Weather and Industrial Disputes are to be made and clearly identified. Tender Specific Requirements – Information required to be submitted with the Tender includes: Tender Programme as item 1 above 2. Breakdown of quantities, Chosen output, Resources, Calculations of duration, Specialist contractors used etc. This should be produced as a spreadsheet relating to the BoQ. Tender Planning Philosophy – A list of the main programme restraints, milestones and other important factors, including any alternatives considered, which may have an effect upon the programme. For successful tenders this will be expanded into a written narrative explaining the philosophy behind the Tender Programme. The Project Manager and Project Planner will be required to give a presentation of the Tender Program philosophy explaining the logic behind the document. The Program is required to address and identify specific programming issues including: The Contractor is required to provide a Project Programmer who will be assigned to the project to fulfil the objectives for the duration of the Contract. Prior to the award of the contract the Contractor will be required to prepare the following for acceptance by the Architect and Project Manager: Developed from the Tender Programme on a Gantt Chart in format in sufficient detail to allow for accurate progress monitoring for contractual purposes. The activities on the programme must be fully logic linked and scheduled to identify the Critical Path to the project. The programme is to be prepared with the following Key Drivers in perspective. To show the sequence of operations and output required from the Main Contractor and Sub-contractors. To provide a yardstick for monitoring progress against forecast for individual activities. To furnish the Client with milestone dates for decision-making and occupancy. To discourage changes in design by indicating the natural consequences, while at the same time facilitating amendments and minimising their harmful effects should contingencies arrive. The detail to be depicted on the programme should be set out in accordance with the following guidelines: Each and every activity on the programme is to be detailed to include the following detail: Activity reference number 1. Activity name and outline description 1. Early Start date 1. Early Finish date 1. Late Start date 1. Late Finish date 1. Free Float for each activity 1. Total Float for the programme 1. Dependent Activities as above 1. Resources to be deployed on the specific activities 1. The programme chart must clearly identify Project Start Date and Earliest Completion Date for the project, including allowances for inclement weather and potential delays due to industrial relations disputes. In addition to that outlined above, documentation to be submitted by the Contractor includes: Cash Flow Forecast 2. Schedule of Submittals to be provided for the approval of the Client 2. Schedule of Samples to be provided for the approval of the Client 3. Contract Project Programmer Notes: All information used to arrive at individual activity durations and sequencing of the works: Breakdown of quantities 3. Calculation of durations 3. Specialist contractor used 3. This document should be produced as a spreadsheet relating to the BoQ. All major items including Prime Cost and Provisional Sums must be

accounted for.

9: Capstone Planning & Control W th Ave Broomfield, CO Construction Management - MapQuest

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A set of skills. Specialist knowledge, skills and experience are required to reduce the level of risk within a project and thereby enhance its likelihood of success. A suite of skills. Various types of tools are used by project managers to improve the projects chances of success. Examples include document templates, registers, planning software, modeling software, audit checklist and review forms. A series of Processes. Various management techniques and processes are required to monitor and control time, cost, quality and scope on projects. Examples include time management, cost management, quality management, change management, risk management and issue management. PMBOK Although the definitions are slightly different in their description, there core meaning is exactly the same and is widely accepted by the profession itself as an accurate statement. Theory of Project Management To begin we need to understand what constitutes a theory. A theory consists primarily from concepts and casual relationships that relate these concepts Whetten This is not the first time it has been omitted, in their analysis of project management research, spanning forty years, Kloppenberg and Opfer have nothing to report on the theory of project management. Project management as practiced today is indeed a theoretical process, however this theory is narrow and needs further development and enrichment. They argue that it is the lack of understanding and development of the theory that is a major problem associated with project management. Thus they conclude that an explicit theory is the crucial and single most important issue for the future of the project management profession. A theory of project management should be prescriptive and reveal how actions taken contribute to the set goals and objectives Kosela As a general basis there are three possible actions; Design of the system employed in designing and making Control of those systems in order to realize the production intended Improvement of those systems Project management and indeed all production has three kinds of goal; General product production Internal goals, such as cost minimization and level of utilization External goals, needs of customer, quality, flexibility and dependability Kosela basically argues that the theories of project are the same as theories of production. The reasoning behind this is that project can be seen as a special type of production. This is evident from the definition of a project according to the Project management Institute He defines the purpose of scope management as follows; An adequate or sufficient amount of work is done. Unnecessary work is not done The work that is done delivers the stated business purpose WBS From a theoretical viewpoint Turner claims the following; 1. Project management is about managing work. Work can be management by decomposing the total work effort into smaller chunks of work, called activities and tasks PMBOK Guide 3. The conceptionalization and principle of decomposition serves three essential purposes of project management. Although not specifically mentioned it is an implicit assumption associated with decomposition, this is that task are related if at all by sequential dependence. When the PMBOK Guide is studied it reveals that activities and task are the unit analysis in the core project management processes, scope management, time management and cost management. It also states that these management controls are centralized. This view is also supported by the description of Morris In other words, there is a set of resources which we call inputs. A transformation process operates on this set and releases it in a modified form which we call outputs. The management of this transformation is what we mean by production management. This theory based on operations is an argumentative one, there is surprisingly, at present no clear academically or professionally agreed theory for project management as a discipline, which considering the quantity of projects undertaken and the financial expenditure of these project extremely surprising and if koskela is correct then a rather alarming omission on the part of a so called professional industry. There are many other descriptions for the four phases however the content of each phase is universally agreed. The fast track approach does not adhere strictly to this phase on a macro level but does using a sequential design procurement package approach follow each phase accordingly.

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