

A civil engineering management portfolio construction essay

[Business](#), [Accounting](#)



A Portfolio will be prepared on the direction of Civil-Project.

Aspects such as the Health & A ; Safety, Environment direction, Quality direction, Financial & A ; commercial direction and Human Resource direction will be explained in inside informations. A instance survey will be taken up to supply sound support to the facets mentioned above. The said instance survey chosen for the intent is the celebrated Channel Tunnel. The channel tunnel is the largest technology undertaking to be in private financed boulder clay day of the month. The channel connects Folkenstein, Kent, United Kingdom to Coquelles, Pas-de-Calais, France covering 32 stat mis about. The undertaking cost was about \$ 14.

7 billion or ? 10 Billion harmonizing to the Bechtel Corporation, one of the companies hired by the Eurotunnel to finish the tunnel as they faced completion jobs after the origin of the undertaking. This channel has three tunnels which are interconnected, while two on the either sides are used for the rail systems, the one in the Centre is used for care, rider emptying and fresh air supply. The undertaking faced many jobs such as fiscal jobs, proficient sufferings, agendas which were ne'er fulfilled and public conflicts between Eurotunnel and its contractors. In malice of all this the undertaking was completed in 1994, after it was ab initio thought of every bit early as 1802.

Figure: Channel Tunnel Exhibit in National Rail Museum, York

Health, SAFETY AND ENVIRONMENT MANAGEMENT

For a concern house to prolong itself in the field of civil undertaking development, it is extreme of import for it to hold an faultless record in Health, Safety and Environment committedness and policies. It is so because, it affects contractors, its employees, its reputé and hence its stakeholders.

Health, Safety and Environment (HSE) Management may cover these wide Fieldss: Safety coordination during assorted stages such as design, fiction and building Preventive steps recommendation Chalking out of coordination programs Hazard analysis with respect to safety of employees/workers Deployment of wellness and safety programs Access controls for designated countries Control of forces protection equipment (helmets, baseball mitts, places, etc.) Safety signaling control Periodic auditing and particular coverage about the non-conformities in the system Training for direction, supervisory and executing forces of subcontractors and visitants Conforming to the Environmental and legislative ordinances Safe transit of Hazardous stuff

Importance

Table: Nonfatal Occupational Injury and Illness Incidence Rates (per 100 full-time employees)

Industry 1996 2006
 Agribusiness, forestry, fishing 8.76 Mining 5.43
 5 Construction 9.95 9 Manufacturing 10.

66Trade, Transportation and public-service corporations8. 75

Table: Fatal Occupational Injuries in Construction, 1997 and 2004

Year19972004Entire human deaths1, 1071, 234Fallss376445Transportation system incidents288287Contact with objects & A ;

equipment199267Exposure to harmful substances and

environments188170Beginning: U. S. Bureau of Labor Statistics,

Occupational hurts and Illnesss in the United States by Industry, one-year

(Bowker & A ; Liebermann, 1972)As the Table 1 illustrates, the building

sector shows really high rate of hurts /illnesses and hence lost working daies

than in virtually any other industry. These hurts and unwellnesss prove to be

extremely dearly-won in times of stiff agenda. As citing from Engineering

Statisticss, (Bowker & A ; Liebermann, 1972)" The Construction Industry

Cost Effectiveness Project estimated that accidents be \$ 8. 9 billion or about

seven per centum of the \$ 137 billion (in 1979 dollars) spent yearly for

industrial, public-service corporation and commercial building in the United

States.

" This includes direct costs (medical, workers ' compensation premiums &

A ; benefits, liability losingss & A ; belongings losingss) every bit good as

indirect costs (like reduced worker efficiency and productiveness,

undertaking holds and equipment harm) . In such scenarios, guiltless

bystanders may besides acquire. Hence such incidents have to be kept

under cheque. Table 2 provides information about assorted incidents which

might go on at a building site. It provides basic information about how the

precautional steps must be directed for a civil undertaking as maintaining the workers good informed and supplying them with good safety equipment will cut down more than half of these accidents. E.

g. Harnesses must be given when hazard of falling is at that place.

Case Study

Leadership: An accent was placed on developing accomplishments among supervisors to promote them to dispute insecure patterns and to actively promote the workers to acquire involved in assorted wellness and safety plans. Safety Briefing Workshops: Such workshops were attended from managers to workers so as to develop good co-ordination and communicating among the work force. These included safety initiations, presentations, and briefing Sessions, site Tours to give all kinds of information required by the workers to work efficaciously and safely.

Figure: Such a briefing workshop is traveling on sing Crane at site

Communication: plans such as Safety Task Analysis Risk Reduction Talk (STARRT) which was a pre-task briefing which enabled workers to discourse with their supervisors sing safety issues related to the twenty-four hours ' s work and the associated control steps. And The Target Zero Truck which was suggested by the workers it visits different sites with updates on safety and wellness issues.

It was equipped to manage picture conferencing to enable the workers to acquire in touch with their supervisors. Target Zero was taken up so as to do

avoid any loss of worker ' s life. Wages and Reports: Updates and qui vives were fleetly provided. Near miss incident were made easier to describe with lesser paper work and wages were provided for safe on the job patterns.

Respect the Environment: this was the slogan of this undertaking.

No marine life was disturbed in the procedure as it was belowground undertaking. Chalk extracted from digging sites were disposed off in friendly mode in Shakespeare Cliff, UK.

Figure: Disposal site at Shakespeare Cliff, UK

Eurotunnel apparatus an Environmental Management System (EMS) to continually supervise the environmental public presentation and commanding impact of its operations. This was done by optimising the direction of waste (clients besides included) , of H₂O and optimising the power ingestion.

Eurotunnel has besides supported the local environment by maintaining noises /nuisances under cheque every bit far as possible. The EMS system is based on the demands of ISO 14001, which is a accepted criterion for the puting up of environmental direction systems. Eurotunnel for it attempts has been acknowledged legion times including having in FTSE4Good Index, the ethical stock market index. In malice of this 10 workers lost their lives during this undertaking. (8 British and 2 Gallic) .

While one died after being caught between immense concrete run alonging section and the tunnel boundary wall. 3 others were killed by the trains

transporting back-forth building stuff.(Anderson et al, 1994) (Eurotunnel Environment Report, 2003)

QUALITY MANAGEMENT

Decisions taken during planning and planing phase sing the criterions to be maintained during the undertaking ' s life-cycle can be described as the Quality of that undertaking. These determinations can be harmonizing to the initial requirements/ demands, societal & amp ; political Torahs and cost bounds. Hence Quality control refers to the conformity to these set of criterions.

Quality direction can be taken as amount of Technical, Operational and Project related aspect direction. These are managed by a Quality Management System (QMS) which must adhere to some set criterion like ISO 9001: 2000. Quality confidence (QA) enfranchisement is provided for the QMS system by Government bureaus to guarantee the investors of the organisation ' s claims. (Govt. of NSW: QM Guidelines, 2005)

Technical Management

The proficient facet of quality direction can be defined as conforming to the rules/standards set in the contracts. These contracts provide the general skeleton on how to run the undertaking and hence can be described as its proficient side. Activities and cognition pertaining to an activity should non be confused here as it will be considered under the operations direction. Contracts, though frequently changed to make a common understanding carry certain common characteristics and utilize fixed industry criterions

such as the 1s drawn by UK Institution of Civil Engineers (ICE) or International Federation of Consulting Engineers (FIDIC) .

These contracts have different construction and content based on different range and type of undertaking. These will include specifications, waies and instructions to employer, tenderers, employee and contractor. Bill of measures along with agenda of work may besides be present here but these can be modified. However, a defect rectification period and a public presentation bond are present to maintain the employers involvements safe.

Auditing is carried out from clip to clip and any misdemeanors or rolling from the contracts is dealt harshly. (Hendrickson, 2000)

Undertaking Management

About all large undertakings have jobs related to this facet of their quality direction. These are by and large encountered with holds, cost escalations and recriminations. And this so happens because the undertaking is mistily conceptualized or the full deductions of it are non realized in this important stage. This might non work in the favour of the organisation in most of instances hence, must be dealt right and carefully.

Figure: Graph demoing intensifying cost of rectifying work at each phase (Thorpe, 2004)

As the figure shows it is much easier and less expensive to take things into history and do alterations in the design stages as costs spirals out during the ulterior phases. The grounds which might take to a sudden demand for

rectification are deficiency of adequate of field research, hapless planning, uncomplete specification and unequal preparation.

Hence, in order to successfully pull off and finish a undertaking within the stipulated clip following stairss can be taken: Right individual must be chosen for the right occupation i. e. workers must be skilled ; directors must hold leading, actuating accomplishments etc.

They must portion a sense of duty towards the work assigned to them. The responsibilities and duties must be clearly and officially defined so as to avoid confusion. Requirements must be good understood. Studies and research must be carried out suitably to find any unanticipated deduction of any alteration. Based on the demand and research, a design design must be prepared. Planing must be done and feedback must be taken to maintain the undertaking running swimmingly. Activities which are planned must be coordinated and monitored as portion of the feedback system to do certain aims are met.

Communication and coordination among different working and pull offing groups is indispensable. Following these stairss the direction of the undertaking is simpler and tends to give fruitful consequences. (Thorpe, 2004)

Operations Management

After the initial contracts have been drawn and planning has taken topographic point, the work needs to be started. Operations such as grading of the site, plane surveying, putting out of tunnels, grapevines perpendicular

support systems should be done. Testing cavities for the dirt should be made for proving Rotary nucleus boring, light overseas telegram percussion boring and heavy percussion boring.

As the building is to be carried out safely, it is necessary to prove the dirt by wet competition testing, unmoved denseness testing and compression trials. The equipment must be checked to avoid any bad lucks during the operations. To run the operations swimmingly, the functions of employer and the managing applied scientist are really of import. Following stairss are of import from operations ' perspective: Any contract related ambiguity should be worked out as they set the guidelines. Any design specifications required during the building procedure. Taking determinations on any unanticipated undertaking scenario.

Keeping an internal audit/check system to maintain the advancement harmonizing to the contract/specifications. Employer can maintain a cheque on this procedure by holding his ain people inspect the advancement and audit system. Working out any planning procedure, attesting completion of some activity and maintaining records of any claims made by workers, contractors etc.

Deciding on any coordination differences or communicating oversight. These are by and large along with fiscal power are segregated to maintain the work from going piled up and to forestall abuse of power. (Hendrickson, 2000)

Quality Management System & A ; Quality Assurance

Quality Assurance (QA) can be described as an instrument for guaranteeing that the building procedure takes topographic point harmonizing to a Quality Management System (QMS) . This means that the QA system defines the construction, responsibilities and duties for implementing a QMS. Hence, holding a QA system in topographic point provides satisfaction to the employers about the uninterrupted nisus for success and flawlessness by the organisation.

Case Study

Sing that the initial thought was put around 1802, general consensus could merely be reached around 1970-80s.

The trifle of the issue was stuck on the issue of national security which was nil more than a political scenario. After acquiring over this, it was decided to do such a large undertaking as a in private funded undertaking as the success of it was at inquiry. With a pool of private participants chiefly Bankss, a squad was made which was later called Eurotunnel, which was given concessionary period of 55 old ages from 1987. Project direction was hard due to the sheer size of the undertaking. This is apparent from the holds caused due differences created by the increasing demand for more money. Demand for money increased from ? 2. 3 billion in 1985 to a concluding sum of ? 10 billion around the decision of the undertaking.

The hold resulted in the undertaking enduring for a decennary while the initial estimation harmonizing to analyze around 1984 was around 4 and a

half old ages. Design had to be changed as wet parts were found around the UK seashore and necessitate cement and concrete injection which besides raised the demand for finances. Operations were marred by deficiency of communicating and safety issues were besides forgotten. But overall the undertaking was completed successfully and is one of its type. (Anderson, 1994)

FINANCIAL MANAGEMENT

A undertaking starts with cost appraisal taking into history capital cost, operation cost and the care cost. Capital cost screens land acquisition, planning and feasibility surveys, design both technology and architectural, staff, equipment, labour costs, insurance and revenue enhancements, review and testing and office operating expense charges.

Whereas the operating costs would cover staff rewards, fix costs, redevelopment and other public-service corporation costs.

Important Features

From direction point of position things to look out for are: Land acquisition costs are the largest among this subdivision and hence must be good thought out. It is besides of import to see any alternate installation or operation in topographic point of a proposed operation if the possibility of cut down operating expenses is present.

Certain sum must be allocated for some eventualities, this facilitates better state of affairs handling. Future planning is of import and any estimation should be done with an oculus on undertaking ' s future range. Cost indices

must be taken into consideration in instance the undertaking is of a long continuance. As it is apparent from the figure that the costs will lift over the old ages.

Figure: Monetary value and cost indices for building for a US based Construction Company (Hendrickson, 2000)

Estimates should be based on production map which is a relationship between building ' s volume and capital/ labour. It could besides be based on unit cost of measures or based on some statistical techniques. A program should besides be made about how this estimated sum is to be allocated during the range of the undertaking from one stage to another.

It would be more dependable if the allotment procedure is based on value of work completed which can be described as the merchandise of certain units being completed and the billable labour hours spent per unit. Then, at any phase the sum of work completed in per centum is the ratio of completed value of work to that of the full undertaking. It therefore becomes easier to track the outgo and pin down the cringle holes within it. Curve B shows the consequence of rapid capital mobilisation while curve A shows slow mobilisation.

Figure: Value of Work Completed over Project Time

A civil undertaking has some installations related to it and these can be economically evaluated and financed harmonizing to the demands. Such undertakings have some hazards associated with them such act of God, suspension of work etc and hence must be financially covered in contracts. Once the undertaking enters into executing stage, record maintaining and

feedback become of import for maintaining control on the undertaking and therefore commanding cost disbursements. Regular accounting and monitoring are of import characteristics of this.

(Hendrickson, 2000)

Case Study

Operations such terminal and land surface plants were bundled together while fixed equipment cost were kept separate. Service tunnel, running tunnels, run alonging of tunnel along with digging stages were individually evaluated. While the costs of bird and engines procurement were kept separate. Detailss have been explained in the figure below.

Figure: The Construction contract in 1985 (Veditz, 1993)

The capital for this intent was to be raised by the private sector and the engagement of the authorities was traveling to be nil. Eurotunnel which was to pull off the tunnel raised the capital by publishing equity II and III portion. This accounted for 20 % of the overall cost while 80 % of the capital was raised by the private bank in signifier of loans.

Figure: Cost Detailss for Channel Tunnel (Anderson, 1994)

Concluding cost of the undertaking by 1995 was around ? 8 billion.

Out of this ball of capital i. e. ? 6. 75 billion was spent on building, equipment and the tunnel commissioning. Whereas ? 2. 75 billion was paid as fee and involvements to the loaning and serving Bankss. The cost increased due to unparallelled technology challenges, singularity of geology such as the chalk

transition, province of the art building stuff and lifting labour & A ; industry costs. The contract was awarded to CTG-FM as it had simpler fiscal portfolio and this pool included national railroads of both the states.

And Eurotunnel was organized to raise the needed capital by agencies of loans and equity. With the initial cost in 1985 being quoted around 1431 million lbs, there was a net 94 % addition in the outgo, doing it a mega graduated table undertaking of capital intensive nature. (Veditz, 1993)

HUMAN RESOURCES MANAGEMENT

Civil undertakings are labour intensive and over the old ages its relevancy has emerged. The direction of this resource involves betterment of effectivity and productiveness by better direction and supervising. It besides involves uninterrupted betterment in the work force ' s accomplishments so that they are able to encompass new engineering and guidelines better. Management of this resource should cover the undermentioned facets: Motivation and leading accomplishments should be equal to animate and steer the work force towards a successfully project completion. Age, retirement and publicities should be carefully monitored. Adequate chances should be provided to an person to show himself and turn within the organisation.

Suitable persons should be found to replace the aging work force to keep continuity in the operation of the organisation. Working conditions should be made suited in order to pull maximal productiveness which is one of the chief purposes of this direction. Job size and complexness should be matched absolutely to an person.

Local cultural values should be considered when a undertaking is being carried out in foreign land. Absenteeism, early quits and loss of life should be adequately planned for beforehand. Absenteeism should be discouraged and some inducements should be provided to maintain it under cheque. Feedback should be taken to keep proper accomplishment degrees. Quality control on the cognition, judgement, dependableness, analytical ability with ability to execute under force per unit area & A ; emphasis and safety consciousness are some of the key features which should be developed and improved on. This will finally assist the organisation map better and prolong itself under proving times. Communication should be encouraged between direction and the work force. Unions should non be discouraged.

However a cheque should be kept on the working on such brotherhoods. Leadership should be encouraged and invention should be kind for. Incentives should be there for invention at even the labour degree. (Hendrickson, 2000)

Case Study

The channel tunnel undertaking involved around 15, 000 workers.

And with such a high head count and undertaking of this tremendous size, communicating and coordination was the most of import factor to pull off. Team work was encouraged and regular preparation Sessions were held to update on safety issues and allow cognition about the latest engineering and equipments to be used at the site. Communication between the Gallic and the British side were non so great but a system of conference/meeting was

arranged every three month to sync with each other ' s advancement. It subsequently improved as the undertaking came to its stoping stage.

(Fairweather, 1998)

Suggestion

Harmonizing to Building research constitution study carried out in 1987 on the quality jobs of building sites in Britain. And it was found that half were design related while 40 % were due to faulty building whereas 10 % were due to merchandise weakness. Hence, how to avoid:

Design mistakes

Extinguishing misinterpretations of client ' s demand
Using relevant and updated information
Using quality criterions
Supplying equal and proper specifications

Construction mistakes

Adhering to specifications or criterions
Improper supervising may take to hapless quality work, therefore avoiding it.

Lessons from the Case Study

Delay was resulted due to the engagement of merely the contractors and the Banks, which resulted in misgiving. Political hurdling in civil undertakings are frequently encountered and must be dealt the right manner by bring forth public consciousness and sentiment in undertakings favor.

Relationships such as contractor-employer, lender-borrower must be independent. Right people with right accomplishments must be sought for. A

undertaking development program and a corporate program for the undertaking must be devised and managed good from the starting years.

Summary

Civil undertakings are by and large capital intensive hence Long lead time planning is carried out. Such undertakings frequently demand usage of specialised, latest and dedicated substructure which frequently makes the direction work more boring. The cost direction becomes really of import as underestimate of capital costs, Equipment cost and working cost could gyrate the budget out of control. How the refund is to be done should besides be carefully forecasted. As with the Channel Tunnel, the gross and traffic values were wrongfully forecasted.

Which resulted in late refund of the bank loans as Eurotunnel still owes the banking pool over ? 8billion, and the loss for the twelvemonth stoping 1995 was about ? 1bn. And for any undertaking to win safety ordinances must be installed and environmental Torahs must be adhered to. It is besides necessary that quality direction system should be in topographic point and confidence of it should be taken attention of. This is because today without confidence the opportunities of acquiring some investor, builder are really dim.

To sum up, a portfolio of pull offing some of import facets of Civil technology undertaking were discussed with the aid of Channel Tunnel, taken as the instance survey.