Application of Collaborative Working Agreements in the NZ Construction Industry

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Introduction

It can be fairly stated that the early 1990s were probably not the best time for the construction industries in Australia, the United Kingdom as well as the United States. In Australia major construction companies came and went and mergers of well-established Australian construction companies with German builders seemed to be the norm. The Australian construction boom with the large number of apartments in overbuilt markets; overheated economies, over extended developers and, let us not forget simple greed and mismanagement, led to a significant decline in construction volume. It cannot be understated that the value the of construction industry on each local economy is considerable, for example construction accounts for 4 % of Australian GDP, 8% of GDP in the UK and 5% of GDP in the US.

It could be argued that the decline of the construction industry in the mid-nineties in all three markets can be easily laid at the door of the flow on effect from the US of ever increasing litigation as much as anything else has played a major role. Poor project briefs, adversarial tendering practices all had their part to play as well. In Australia, disputes surrounding major projects have been the subject of much debate in other forums. Late delivery and over budget seemed to the cynics amongst us, as the norm

Whether the claims explosion of the '80s and early '90s was a cause, symptom, or effect of the construction industries other difficulties is for others to sort out; what is certain is that in the UK, Australia and New Zealand the industry's factiousness cannot have helped to ameliorate an already declining situation.

Studying these failures, one could examine several possible explanations for this phenomenon. Undoubtedly, there are many opinions: high interest rates in the early to mid-eighties, inflation, severe competition for fewer projects, margin slashing and out of control speculation, the lack of infrastructure projects in all countries; can all take their place in the line of suspects. Certainly, however, poor project organization a lack of attention to the detail in architectural design, poor project structure, communication, and execution may be identified anecdotally as a key factor in many claim-ridden projects.

In the UK about 1994 the government of the time decided to try and do something with the then prevailing view of ever-increasing failure rate in major projects. In response to this view, Sir Michael Latham, an ex-director of the UK House builders Federation, was commissioned by the Government to head an enquiry to be carried out over one year with the objective of ending "the culture of conflict and inefficiency that dogs Britain's biggest industry". At the conclusion

of the yearlong study, Sir Michael produced an in-depth and wide-ranging report on the construction industries troubles and strife.

The report, entitled **Constructing The Team,** *Final Report of the Government / Industry Review of Procurement and Contractual Arrangements In The UK Construction Industry* [HMSO, London, 1994 (now known as "the **Latham Report")],** {1} was at first greeted with "almost universal praise". As well as reviewing the state of the UK construction industry, Sir Michael made around 30 recommendations for improving industry outcomes.

Some saw the **Latham Report** as a turning point for the construction industry, dramatically reforming relationships between clients and contractors. It recommended that building contracts should be based upon principles of fairness, mutual trust and teamwork, rather than the usual adversarial and confrontational lump sum tender.

The recommendations made by Sir Michael started to filter into the Government major contract area and were soon beginning to have an impact on project outcomes, however further impetus was required and as a result in 1998 Sir John Egan (a well-known company doctor) was appointed to lead a study which produced the report “Rethinking in Construction” {2} to ensure the benefits recommended by Latham would be put into practice. Egan found that there was still a great deal of mistrust between the various parties normally engaged in building and construction, a new and radical change was needed. To see if the benefits that Latham indicated, Sir John Egan convinced the government to fund a series of demonstration projects to test out the theories and establish new ways of working.

Alliances and Partnering arrangements had been tried and many cases were found to have had a wide range of outcomes. A more focused method using demonstration projects was needed which took in the recommendations of the Latham Report as well as the positive results being realized with alliances and partnering.

To this end Sir John and his committee concluded that perhaps more collaboration in the form of working arrangements between the partners would produce better outcomes and that a more focus on costs rather than prices as well as effective project management which was inclusive of sub-contractors would deliver superior results as well as improved performance

Collaborative working or partnering is at the very heart of the Egan philosophy. Almost all the demonstration projects highlight some form of collaboration.

Collaborative working is the process by which the project parties and individuals operate in a mutual manner to align their interests for the successful outcome of the project. Partnering is a subset of collaborative working usually with a more formal type of agreement or contract. Without exception, project team members who had experienced partnering on a project stated that they would use it again on future projects. The process evolves as the partners learn and work together rather than against each other, and keep the high costs of the legal profession at bay

Requirements of a Collaborative Working Agreement

- There should be equitable benefit for all parties in the agreement
- A correct attitude of openness and trust is required to make collaborative working successful
- Encourage team attitude and "What is best for Project"
- Make sure adequate time is spent at the pre-planning stage as it is worthwhile in the long run
- Include all the organizations, sub-contractors from as far down the supply chain as possible, as it is they who do the work
- Long-term agreements eliminate the need to start from scratch on each project
- Do not underestimate the cultural shift involved and the time that could take

Establishing a Collaborative Working Agreement

The main purpose of Collaborative Working Agreements (hereafter called CWA) is to engage the client, design consultants, contractors, sub-contractors, and vendors into one team, with incentives to establish a structure to ensure that everyone works together to achieve agreed shared targets. The idea is the building of a unified team with the purpose of creating an environment whereby outstanding results can be achieved. The incentives are developed into a Gain Share / Pain Share arrangement. If the project is successful there will be Gain Share, if it is not then there will be Pain Share.

Stewart Rix of Collaborative Management Services {3} states "the premise of CWA is that it is built on developing a "unity of purpose" where all parties business needs, and financial success are aligned to create a win- win situation. There cannot be a win-lose result because of the way Gain Share and Pain Share is structured. The most important aspect is that there are no adversarial contracts as in the normal lump sum tender process"

An overview of the CWA system is shown in Appendix 2.0

The basis of managing the project is through the development of "Target Outturn Cost" more commonly known as TOC. Except for those costs specifically excluded, the Target Outturn Cost embraces the entire cost of the project. Those costs specifically excluded, do not fall within the responsibility of the CWA. Costs are used rather than price, so it is simple to see how the cost of an activity is arrived at.

The components of the TOC include design costs, CWA costs, permanent and temporary works, on site management, establishment costs, off-site management, off-site overheads, profit and margins as well as a risk contingency.

Any cost components which do not make up the TOC must be specifically excluded by the CWA management. The CWA is responsible for all cost management from the initiation of

the project as part of the original negotiations to the final handover to the client of any component of the scope of works and the final settlement of all accounts for the work carried out by the partners.

Management of the CWA is undertaken by two groups, first is the Principals Group made up of the most senior managers of the various major partners in the agreement. They oversee and are responsible for the strategic guidance of the project, the second manages the day to day aspects of the project and are known as the Project Executive Group and take direction from the Principals Group.

The most important task for the Principals Group is to agree to the TOC which will be used to manage the scope of the project. The process of arriving at the TOC is very rigorous and it can be expected to take about eight weeks to work through the process of arriving at the expected actual costs, risks etc.

During the process of arriving at the TOC the accuracy of the cost estimates is examine rigorously and must continue to be improved during their development. This may be achieved by firming up and reducing scope uncertainty and removing cost uncertainties. The TOC development process is shown below in Figure 1

Figure 1 The TOC Process

It is interesting to note that Egan {2} in his report Rethinking Construction says the second most important key process is Project Management Implementation. He says that to be a winner in this new process you must "pre-plan your projects and integrate their teams to manufacture, deliver and assemble the components in precisely the right sequence –

ensuring that they get the right components, at the right quality, to the right place, in the right order at the right time with minimum waste"

Indeed, we have found that this emphasis on getting the project planning integrated and right has paid dividends over the previous practices.

Brief Description of the CWA Projects in Question

The three projects are basically similar in that they are major precast concrete multi building campuses. Two are in remote areas where there are limited resources available and the other in a major city where in theory there should not be a resource problem. The total value of these projects is approximately $750, 000.000.00.

A Project Director oversees all three projects for the client. Appendix 1 outlines some of the salient features of the project and the Project Charter and has been reproduced by kind permission of the Project Director. The establishment of CWA for this project was as a result of work carried out by Stewart Rix the MD of Collaborative Management Services

The duration of each project is roughly two years and involves the construction of an average of 26 buildings per site. Most of the buildings are single storey precast concrete with a few multi story precast as well as block work and domestic style construction for amenities buildings.

Each site is managed by the CWA which is led by a major construction company and of these; two due to their sheer size also have other major contractors as sub-contractors all working in a collaborative agreement. The usual trade sub-contractors, i.e. Electrical, Mechanical, Plumbing, HVAC as well as the Architect and Consultants are in the main also CWA partners.

Some trades which do not quite fit into the agreement style of working or did not want to work as partners have been engaged through the usual lump sum tender contract.

The major difference found in developing the Project Management Plans and Schedules in a CWA environment is that there are none of the adversarial contractual clauses that we are all so familiar with. Instead of the head contractor developing the project critical path and telling or instructing the sub-contractors when and where to perform the required work, the sub-contractor is a collaborative partner and is involved in the planning process during the development of the critical paths.

It was during this process that the use of Arrow Diagrams rather than Precedence Diagrams or even Gantt charts was found to be a lot easier for the sub-contractors who stated that logic diagrams made more sense. The result was that the sub-contractors were able to demonstrate considerable time savings in the intended building method, by using the skills of their own trade and the relationships between the different trades.

In some cases, particularly during the TOC creation process scopes of work were found to be rather more expensive than the budget allowed for and as a result extensive Value Management studies were carried out to reduce the TOC so far calculated.

It was quite evident that the collaborative working arrangement made a great deal of sense and would produce significant performance savings which of course are in everybody's interest.

Because of the choice of the use of Arrow Diagrams, Micro Planning International's X-Pert for Windows was purchased by the projects. In addition to the advantage that X-Pert for Windows can process arrow and precedence diagrams, its EVPM capability to control the TOC hours was also a deciding factor.

Establishing the Project Management Planning

During the establishing of the TOC, the project management plans were also developed. A major difference in developing the project management in the CWA environment rather than the usual lump sum project whereby the head contractor develops the plan without too much regard to the sub-contractors; is that in the CWA sub-contractors are very much a part of the plan's construction. In fact, the sub-contractors who are of course equal partners in the CWA were encouraged to come forward with ideas which lead to better ways of construction as well as less expensive ways.

Each CWA has a Project Manager, who has a Planning Manager reporting to him, who has various schedulers and planners reporting to the planning manager. This meant that in a very short time many sub projects were created all fully resourced with the various trades and the Budgeted TOC hours allocated to each activity.

During the establishment of the budgeted TOC hours a Quality and Risk Assessment was carried out to make sure that there were no hidden risks and that the building would meet all the building codes and quality requirements, in fact the very process of building the Budgeted TOC was also defined in a critical path sub project.

Establishing the Critical Path Networks

As has been previously stated the critical path networks (there is currently a total of forty sub projects) were developed in conjunction with each sub-contractor. This usually took between two to three days to have a fully resourced detail plan for each building the sub-contractor was working on as well as capturing the TOC hours.

It was interesting to see how the various trades very quickly adapted to collaborating with each other whilst the networks were being produced. There were some significant time savings made by trades collaborating to get the activities completed in the most efficient manner. In the main this was achieved by activities being worked on in parallel. The credo for the project in the CWA environment is "Do what is *Best for Project".*

Whilst developing the actual sub project, a work breakdown structure was developed as well as dividing the site up into the Zones, in which the various buildings were to be built. A major part of the construction managing process was that each zone was managed by a Zone Manager, each of whom came from a major construction company, who in the usual project environment would have been fierce competitors, but in this case, became collaborators.

This resulted in a very much more efficient use of resources as each zone manager swaps a trade where he has capacity to another zone where that trade is critical. This meant we operated resources mainly site wide, even though they were from different contractors. The performance gains went into the pot known as "Gain share"

Managing such a lot of sub projects, was achieved by creating folders for each Zone and storing the sub project inside the specific folder. All the data as well as was stored on a common disc drive available to everybody on site. "It's on the S: drive became the common response to," where are the reports?"

The Work Breakdown Structure not only covered each building Zone but the Non-Construction activities as well. Figure 2 shows part of the WBS at level one and two elements. Level one is the total project and the contents of the box shows on the top line the Total Budgeted TOC hours for the project. The second line shows Actual TOC hours spent to date and the third line shows the estimated TOC hours to Completion. Each level two element is further broken down into a specific building and that is further broken down into six elements representing the major work packages.

Figure 2 – Work Breakdown Structure

A typical building arrow diagram that was developed is shown in Figure 3 below: -

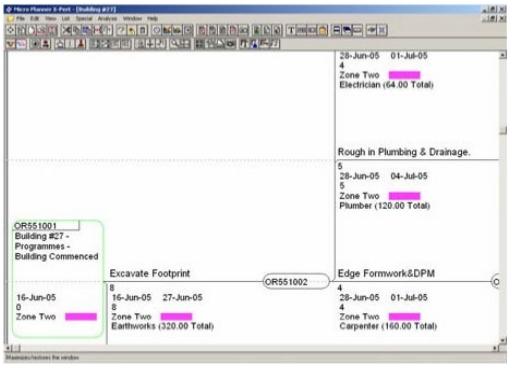

Figure 3, part of a typical sub project

Performance of the whole project is very important and is managed using Earned Value Performance Management methodology as well as the usual project office activities.

The Project Executive Group (PEG) meets formally on a weekly basis and informally daily to ensure that the project is indeed working, that any design issues are resolved, and to arrange the taking on of additional resources needed to prevent any delays.

The most interesting thing to note is that all the PEG members are treated equal as this is the very heart of a collaborative working agreement. It consists of the CWA Project Manager, CWA Construction Manager, CWA Planning Manager, CWA Design Manager, CWA TOC Manager, and CWA Commissioning Manager. The PEG is reliant on the project planning summary Gantts as well as design and construction documentation for decision making.

The PEG reports to the Principals Group (PG) monthly, the Principals Group is made up of the Client Project Director and the Managing Directors of the Major CWA Partners, in addition a senior member of the Client Quantity Surveyor and a Director from the Consultants who are managing the CWA TOC process in all three sites are also members.

The PG provides direction and guidance to the PEG and oversees the expenditure and schedule to date as well as the forecasts to completion.

Monthly the Client Project Director reports to the Steering Group (SG) which consists of the Chief Financial officer and other client senior managers. Targeted reports for such a senior group were designed and to date have been very successful in communicating the actual project performance in a quick and concise manner.

Reporting Project Performance

For management and reporting purposes each of the three major stakeholders, i.e., the PEG, PG and SG has specifically designed reports. This involves various levels of milestones being defined in the input and roll ups in the Work Breakdown Structure which allows for the specific information to the three groups.

Every week the project plan is progressed, the progress data is collected by issuing each Zone Manager a Gantt report which shows activities one week in the past and three weeks into the future.

For example, in Figure 4 below, the activity **Install Wall Stud & Paper** is in progress and the Zone manager can see the actual start date that was entered, the actual TOC hours to date and the balance to complete which was entered in the previous progress run.

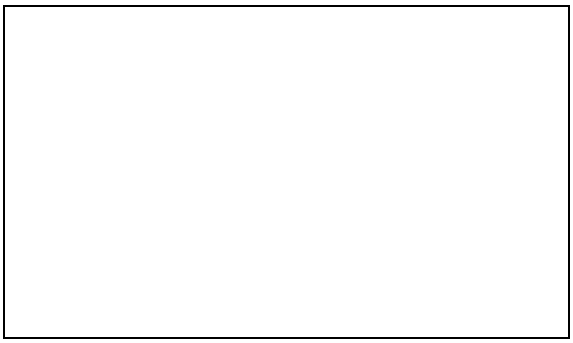

Figure 4, showing part of the schedule report

Once the progress data has been entered and analyzed reports are produced for each of the stakeholders, For, example one of the CWA Project Managers prefers information in the form of pie charts as these show very clearly the distribution of the TOC hours by each Zone as shown in Figure 5 and this can then be verified by the actual hours encoded on Timesheets. Other pie charts are produced which show the breakdown of TOC hours by every trade and by building

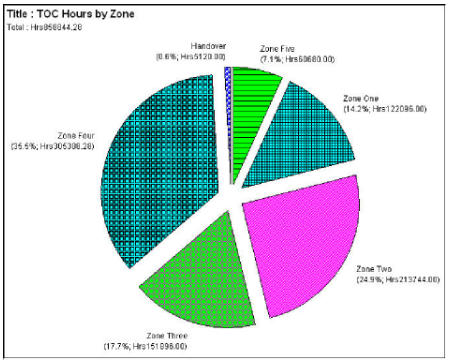

Figure 5 TOC Hours distributed by Zone

The PEG is provided at each progress run with a summary project Gantt, which is in fact hammock activities across each building and major site works, figure 6, shows both the baseline and the current progress. This is a very rapid way of indicating any slippage in any specific building.

Figure 6: - Project Summary Gantt

Each foreman is provided with a Gantt chart showing his trades scheduled work for the remainder of the project. Figure 7 shows the baseline schedule as well as the current schedule. It clearly illustrates the effect of resource limitations splitting an activity.

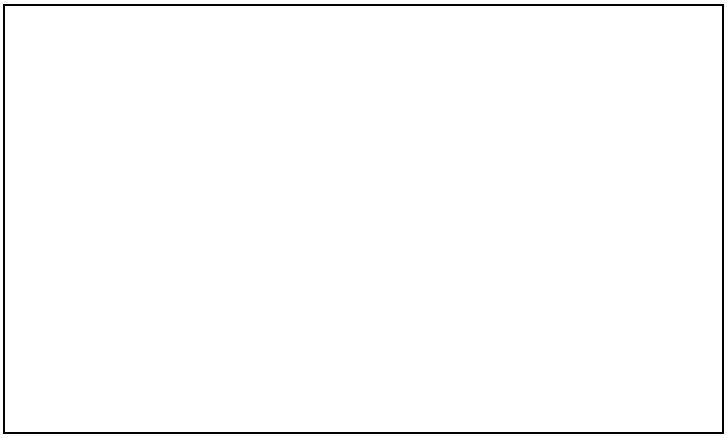

Figure 7 – Major Milestone Variation Report

The TOC hours are managed by the TOC team and are an extremely important part of the performance management of the project. A one to one relationship between activities in the project plan and in the TOC, system has been established and the reporting of actual hours worked on an activity is captured by timesheets. Every person who comes onto site has that fact captured electronically and so it is a simple matter to ensure the veracity of the hours claimed on timesheets. Resulting from each progress run, a Planned Versus Actual TOC hours' report is produced from Micro Planner and is cross validated with the TOC system. Figure 8 shows the data and of course any variations

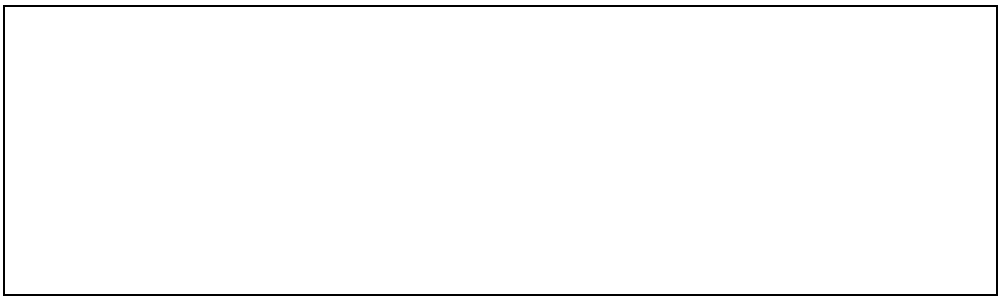

Figure 8 – Planned v Actual TOC hours

The managers of each of the various trades are provided with resource histograms showing the forecast resource distribution of that trade. The project is analyzed on a Time Deadline Critical basis which means the end of the project cannot be delayed due to lack of resources. Micro Planner in the instances of resource shortage potentially causing a delay will overload the resource as shown in Figure 9 by the red colour. This report is the aggregation of all the resources allocated and indicates that some of them have been overloaded.

Figure 9 – Total Project TOC Hours

The CWA Planning Manager uses an S-Curve, Figure 10, showing the TOC hours for rapid performance checking to ensure that the project is tracking to schedule as well as the budgeted TOC hours.

Figure 10 – Total Project TOC Hours Profile

Benefits of a Collaborative Working Arrangement

- Improved predictability of cost, time and quality
- Minimised risk
- Reduced costs
- Enables all parties in a team environment to make maximum contribution
- Promotes innovations with additional benefits as to "Best for Project" attitude
- Understanding of others party's issues
- Continuous improvement of process as it is in the interest of all parties
- Development of long-term relationships and highly efficient vendor supply chains.
- Improved trade performance and better schedule control
- Workarounds to reduce delays when things go wrong

Conclusion

There is no such thing as “The Perfect Project”, but now that the projects have been running for almost twelve months, the benefits outlined above are beginning to make themselves felt and in spite of some severe weather at one of the project sites, some of the unavoidable delays have been minimized and have not lead to the usual adversarial posturing that goes on in the typical lump sum tender process. It has been quite gratifying to see the different construction companies (who normally would not be very co-operative) helping each other out to sort out unforeseen problems when for example; materials fail to perform according to specification.

It is my belief after 40 years or more in construction projects that Collaborative Working Arrangements are a great improvement on the existing construction methodology of internecine warfare and to date are showing excellent performance improvements.

Appendix 1 Some Detail Concerning the Project - Otago Correctional Facility

The following information outlines some of the salient details of the project discussed in this paper and has been reproduced by kind permission of the Project Director. Actual names have however been withheld at the request of the client.

The Otago Correctional Facility holds 335 male inmates and was completed late 2006, approximately 6 weeks early. There was also a significant Gainshare

A Collaborative Working Arrangement contract between the client, contractors and Hawkins ensured a dedicated team effort throughout the process.

Hawkins, as the main CWA partner, responsibility was to complete the construction with no flaws as there would be no opportunity to amend defects after the facility has opened.

The commissioning process is a complex affair as it not only has to ensure that the buildings are fit for purpose and security cannot be compromised but that the Department of Corrections Duty of Care to the prisoners is maintained without impairment

The project layout is shown in the figure 11 below

Figure 11 – Aerial view of Project Crioch

A1.1 GENERAL INTRODUCTION

This Management Plan outlines the procedures and practices necessary for the Project xxx (the team charged with delivering the project) and their Subcontractors to undertake the Corrections Facility in accordance with the following documentation.

- Design Brief
- The Resource Management Act 1991.
- The Designation Consents Dated Dec 2004

Description of Project

The Correction Facility (CF) will accommodate 335 male inmates and is in the South Island. Construction started in December 2004 with completion scheduled for December 2006. (Which was achieved)

The proposed works consist of approximately 25,000m2 of construction in 25 different single and double story buildings spread over 15 hectares on a "green fields" site.

The Department has determined that the best way to deliver the project on time and within budget is by using "Collaborative Working Arrangement" contracting methodology.

Key facts are: Status:

Value:

Main Proponent: Contract Style: Anticipated Handover: Construction Style: Inmate Numbers: Workforce Anticipated:

$175m +/-

Construction commenced December 2004 XXXX Construction and YYYY Collaborative Working Arrangement March 2007

Wide rise on ‘green fields’ site

335 (Male)

Approx. 400 trade staff

For most of us, our traditional contracts involve a completed design which is awarded to a contractor. Both the design and the financial model are therefore assumed to be robust. Project xxx differs from a traditional contract in that whilst our design is well refined, it still requires completion and input from all contributors, be those people, contractors or architects. It is a team game and together we must complete the task.

The project must be constructed with the following foremost in our mind:

Safety -It is everyone's responsibility to work safety and have due regard to the safety to the safety of others.

All on site staff will be 'site safe' and project specific inducted.

Task planning will be an essential tool in identifying potential safety issues.

Quality - The facility will be handed over with no defects. There can be **no** 'snag list'.

The Department has certain construction techniques and details that are to their facility and its operational requirements. *"Make good in a tradesman like manner"* may not be appropriate on the site. Under the Target Outturn Cost (TOC) arrangement, poor quality and the cost of rework will be detrimental to all parties' financial rewards.

Environmental

The project must minimize our impact upon the environment.

Planning and controlling our worksite will be a key factor when ensuring we meet our environmental objection.

A1.2 PROJECT ROLES

Principals Group

The principal's group is responsible for the overall reviewing of the PEG team decision-making process, and the "overall health of the project". It is to provide direction to the PEG team where such advice is needed.

Project Executive Group (PEG)

The Project Executive Group is responsible for the overall delivery of the project within the time, cost, quality and HSE objectives set down by the principals group. Each member of the PEG group has a defined scope; however, together they are to unite their collective wisdom and drive to ensure the project is delivered to the agreed standards in all regards. The PEG group has six key members, and an officio member. Their roles are as follows

CWA & Consents Manager

The CWA & Consents Manager is responsible for:

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- Maintaining links between RPDP and the project Crioch team
- Review overall balance of the PEG team and identifying measures to address these.
- Delivering to the principal's accurate and current project summary reports, to ensure decision and feedback process is timely and well informed
- Ensuring design shortcomings, both in terms of resource and attention to detail is managed and addressed as required
- Managing document control system and process
- Lodging all consents, and the final closing out of operational manuals, guarantees and the like

Financial Manager

- The Financial Manager is responsible for
- Overall financial management of the project
- Ensuring procurement is followed in accordance with the project guidelines and in a timely manner to meet the overall programme requirements
- Formation and presentation of the Target Cost Model
- Tracking actual spent to forecast spend at each milestone in the project, and providing reports discussing the anticipated actual cost to the TOC.

Risk, Quality, Programme, Commissioning & Hand Over Manager

The Risk, quality, Programme Planning, Commissioning & Hand Over Manager is responsible for

- Compilation of a risk model and the processing of this information to ensure that all parties understand what the risks to the project are, and what the options and costs are to mitigate these risks
- Reviewing the Risk model throughout the project duration, whilst liaising and discussing this information with the PEG team to ensure timely decisions/current information
- Compiling a quality plan, that is both robust and practical, and ensuring that the processes that are put in place are followed.
- The Programming Planning Manager is responsible for managing a team of schedulers and programmers. This team will in turn compile the overall master programmes and communicating this information to the wider audience using Micro Planner X-Pert for Windows
- Providing advice as to appropriate resource levels and the risk or ambitiousness of various scenarios Monitoring actual progress and advising end user as to the slippage or otherwise that has occurred, and the ramifications of such a situation
- Liaising with the financial manager, and providing data on task completeness to ensure that the TOC can be tracked accurately
-

Commissioning the facility for full and final handover to the Department

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Construction Manager

The Construction Manager is responsible for

- Reviewing overall build ability in conjunction with industry contributors to ensure the most efficient structure that meets with the architectural approval is constructed
- Ensuring that enough and appropriate resources have been engaged to deliver the project to the agreed programme and quality standards
- Managing the various trade contributors to ensure the overall site is balanced, and functions as a team
- Management of five zone and various other managers.

Project Architect

The project architect is responsible for

- Delivery of all architectural matters in accordance with both the design brief and the programme, to a sufficiently high standard to meet all the code requirements, and in accordance with good current practice, albeit modified for the peculiarities of a secure prison system
- Providing timely field decisions to ensure on site progress in not hindered by delays that may otherwise occur
- Coordinating the relevant consultants to ensure consents and buildability matters are managed in accordance with the overall programme

Ex-officio PEG Members Health and Safety Manager

- The health and safety manager is responsible for Compilation of the overall safety Management plan, and ensuring that its requirements are implemented
- Tracking, monitoring, investigating and reporting of incidents

A1.3 PLANNING AND PROGRAMMING

Baseline Programme

A resource loaded Target Programme with will be developed to assist in Project Planning and Management of the Project using Micro Planning X-Pert for Windows

The programme will show at least the following features.

- Start date, duration and finish dates of all activities
- Identification of the critical paths

- Amount of float available for each activity
- Manufacture and delivery lead times for major items of material or equipment Client approval windows for critical items
- Required delivery dates for Client supplied materials or information Completion on or before the contract completion date
- Key or milestone dates or separable portion completion dates

Upon completion of the Programme a review process will take place with the subcontractors in order to achieve optimum resource usage.

Once agreed to, the baseline programme forms the basis for the work sequence of the Project.

Updated Programmes

At regular intervals, the construction programme should be updated by entering the actual start and finish dates for each completed activity and reviewing the duration and logic of all remaining activities to reflect changed circumstances or Client requirements.

Any changes proposed to the current work sequence of the programme must be reviewed by the planner, to ensure that all dependencies are properly considered.

To enable the subsequent analysis of any delay that may occur, all programmes whether baseline or updates must be retained on disk to facilitate the retrieval later.

Master Programme

A master programme is one which contains all activities of the project. On a very large project with several distinct phases, it may be beneficial to compile section programmes for each phase. Each section programme must have clear links to the master programme.

Rolling Programmes

To enable more short term planning a rolling programme may be prepared weekly or fortnightly but which only shows activities planned for the next three or four weeks. Each weekly period is therefore produced in more than one programme.

The programme is used to monitor daily progress, material deliveries, manpower required, forward material orders and to advise Subcontractors when their work will be required. It also acts as a reminder of future activities, and to plan the next weeks' work.

This is also referred to as a "look-ahead" programme. Rolling programmes are usually in bar chart form.

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Short-term programmes may also be produced to cover a specific complex event, such as the erection of a tower crane.

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Appendix 2.0 An Overview of Collaborative Working Arrangements and How they May Affect the Risks and rewards for Contractors and Sub-Contractors (written in 2008)

By: Stewart Rix CEO, Collaborative Management Services

The following describes some of the important aspects of Collaborative Working Arrangement and the impact on risks and rewards for contractors and sub-contractors:

- Collaborative Working Arrangements reflect the best principles of project alliancing. They were first introduced into New Zealand in 2002 where they have been used on the (Grafton Gulley and the Department of Corrections programme of projects) the results were exceptional
- The purpose of Collaborative Working is to engage the client, design consultants, Contractors and major sub-contractors in one incentivized team structure to ensure every one works together to achieve shared targets. The building of this "unity of purpose" creates an environment whereby outstanding results can be achieved.
- The normal currency for conventional contracting is a PRICE
- The normal currency under collaborative working is a COST. In short contractors and their supply chain will receive reimbursement of their actual costs, recovery of on-site overheads, allowances for head office overheads and normalized profit margins. The objective is to "ring-fence" overheads and margins and work together to reduce costs and thereby earn exceptional profits relative to turnover. The costs savings (Gainshare") are shared across the project with client, design team, contractors and sub-contractors in accordance with pre-agreed formulae.
- All parties' "prices" in conventional contracts contain allowances for costs, overheads, risk, and profit. The buildup of those prices is not transparent.
- During the early stages of the design development process, the contractor along with their supply chain partners and sub-contractors will be involved in value management workshops not only to optimise design solutions but also "buildability" solutions. The results of this work will be reflected in a robust project implementation plan and scope is built up from first principles and agreed for each trade / building package.
- Labour costs are built up from productivity constraints and material and plant costs also reflect anticipated costs not prices
- Risks are accepted by all participants in conventional contracts on the basis that each party's risk exposure is clearly allocated. Contractors price this risk into their tender prices. The allocation of risk may not be fair and reasonable to the design and construction teams and the price(s) tendered for accepting those risks may not seem fair to clients

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- Risks under collaborative working arrangements are generally shared by all parties on a joint and several bases unless agreed otherwise. Parties with a relatively small input or influence over the project's results may have their downside risks "capped" The Quantitative Risks Register (QRA) is built up in detail and each party has full involvement in the process and access to the methodology. The client's project delivery risks are also included in the QRA. The client may also retain a contingency fund to cover future scope charges
- Under conventions of Collaborative Working, all parties recover their actual costs, overheads and normalized profits. Actual costs are transparent to all parties but overheads recovery and profit margins remain confidential
- The target under Collaborative Working is to reduce actual costs by delivering projects efficiently and effectively, reducing waste and re-work. Provided the Target Cost is achieved or bettered, all participants can recover their normalized profits plus "Gainshare"
- Should the Target Cost be exceeded, all participants will feel some "pain" as those additional costs may be shared on the pre-agreed formula.
- Collaborative Working is built on the premise that by developing a "unity of purpose" all parties' business drivers are aligned to create a "win-win" result. There cannot be a "win-lose" result because of the structure of the Gainshare / Painshare arrangements.
- Monthly progress payments are supported by actual costs invoices. Payment is normally made within 10 days free of retentions. Recovery of overheads and normalized profit is also paid monthly from a separate Trust Fund to ensure confidentiality
- Each party's normal overheads and profit margins are established at the commencement of the project by the independent facilitator. It is recognized (and respected) that sub-trades often work with higher margins than their counterpart main contractors.
- The Target Cost is built up from first principles whereby the actual forecast costs for labour (manhours), materials (+ appropriate allowances for wastage), plant etc. are estimated. In addition to the actual costs the Target Cost includes financial provisioning for the Risks Register
- If any sub-contractor makes a mistake in Estimating, that error could result in financial pain being incurred by all parties. Much care (robust challenges from around the table) is taken to ensure that the Target Cost is both fair and reasonable. "Feather-bedding" of costs is not encouraged because the project may not proceed should the Target Cost be "soft". Moreover, the client will retain a significant % of the "Gainshare / Painshare" and will therefore reap a lion's share of any cost savings
- The project is governed by a "Principals group" which is formed from the CEO's / Departmental Heads of the respective stakeholders. This group will act as the Board of Directors to provide Leadership, Direction and Governance
- Scope changes (variations) are administered in the normal way with adjustments being made to the Target Cost for the additional (or saving) in cost + risk

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