Operational Readiness – Launching Capital Projects Successfully in Local Government

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Abstract

We have all been involved in capital projects of importance to our communities, only to have teething problems with these projects when they are handed over to the business for operational use. The concept of Operational Readiness was developed after some large North Sea oil projects failed to deliver on investment criteria due to commissioning and handover issues. Operational Readiness aims to ensure that large capital projects, and/or projects with significant changes in Levels of Service, are successfully launched and handed over to business owners who are in a position to accept them.

This paper looks at the concept and methodology associated with Operational Readiness and how it is integrated with the capital development of the project to provide an integrated delivery solution. Two projects from a New Zealand Local Authority, one which successfully utilised the concept of Operational Readiness and another that did not, are used to illustrate the benefits of this methodology in delivering large and complex projects. Lessons learned from the comparison of these two projects are also discussed.

Key words – Operational Readiness, Soft Landings, Risk Management, Business Case, Life Cycle Cost management, Design and Safety Reviews.

Introduction

As engineers and managers serving Local Government we are responsible to our communities for the planning and delivery of billions of dollars of assets every year. Many projects are significant in size, represent major initiatives for our communities and often involve changes in service levels and/or internal business processes and procedures.

Whilst there is always significant attention on the spending of capital funds and the timing of this spend the same level of detail is often not expended in preparing the asset owner for receipt and operation of the new assets from the date of handover. This can be a major impediment to the success of a project and can significantly impact the life cycle costs of a new asset or system.

This paper explores a framework for Operational Readiness and demonstrates the impact it has on capital projects by looking at two significant projects delivered by the Christchurch City Council. One used an operational readiness framework as part of project delivery and the other did not.

What is Operational Readiness ?

Operations Readiness, OR, (or Soft Landings as it is sometimes called in the Building industry) is defined as the process of preparing the custodians of an asset under construction, and their supporting organization, in a way that they:

- Are fully ready to assume ownership of the asset at the point of delivery or handover.
- Accept responsibility for, and are capable of, operationalising the

asset in a safe, efficient, sustainable and environmentally friendly way.
- Have laid the foundations for operational excellence to avoid disruptions during start up, ramp up and full operation.

Failure to achieve these outcomes can cause serious value destruction both during construction and most importantly over the life of the asset, degrading the initial Business Case decision to develop the asset.

What will I get out of deploying an OR Framework?

Drawing up comprehensive operational readiness plans by asking the right questions and effectively implementing them help minimize value leakage during the project development phases. This work also ensures a smooth transition into operations and ensures budgets, support systems, training and manpower are correctly set to enable effective startup.

Other benefits likely to flow from the application of operational readiness frameworks in large or complex projects include:

- **Meeting or exceeding** predetermined production targets or key outcomes identified in the original business cases.
- **Reduction** of risk following early identification of operational and management risks and eliminating or mitigating these in design or preparing for them with operational strategies.
- **Improving** the capabilities and knowledge of the project team and also preparing operational staff for the new assets.
- **Better definition** of commissioning dates and associated procedures and integration of Council support procedures.
- **Clear definition** of staffing requirements and dates to ensure sufficient time for operations, maintenance and support groups to be trained. This can include preparation of call centres and IT systems and procedures.
- **Improve** compliance with health, safety and environmental requirements by ensuring risks are minimised and residual mitigation measures are effectively transferred into operational management regimes.
- **Eliminate** or reduce disruptions in commissioning, start up, ramp up and full operation due to defects in equipment, material and systems and/or integration between business units.

When should I use OR Frameworks?

OR teams are formed for the express purpose of assisting project teams launch successful capital projects. Typically the OR team will be relatively small compared to the traditional project/design and construction management team but they are a legitimate project cost and should be treated in the same financial manner. This also helps the operational business devote the necessary skilled resources to support the OR activities.

Project size in itself does not necessitate the deployment of OR frameworks for successful project delivery. In the Local Government environment the following project characteristics may indicate the need for an OR framework to be developed and deployed as part of the project delivery planning.

- new treatment or production processes are being built or

integrated into existing brownfield operations.

- new technology is being deployed on a large scale or to a critical asset or service.
- a large number of customers are impacted or interact with the new project.
- new business models are required to be established to operate the new assets.
- operational failure or under performance of the new asset will lead to media and public scrutiny.
- The project has multiple contracting parties and/or asset elements that must contribute to successful delivery.
- The project has accelerated or very tight delivery timeframes.

Whilst the above list is not conclusive it provides some guidance on the risk elements that should start Project Sponsors/Business Owners thinking about the need to deploy OR frameworks on a project.

Simple check sheets and risk analysis frameworks can help identify the need for Operational Readiness input in a project

It is recommended that Project Management Offices (PMOs) in Local Government capital delivery areas develop and deploy such check sheets in the concept phases of project/programme development. The decision to deploy or not deploy OR frameworks should be authorised and rest with by the ultimate owner of the asset or service.

OR Frameworks and Strategies

How do I ensure value opportunities are identified, risks mitigated and opportunities realised in the formulation of large and complex capital projects?

The adoption of the following strategic elements in a large project will help ensure a strong operational response in the development of large projects.

- Develop a stage gated process to integrate operational readiness reviews into each traditional project stages (concept, preliminary, detailed, construction, commissioning and post-handover phases). This ensures that as the project progresses, the integrated project team (including the OR team) do not miss opportunities and that operations are aligned with the capital project execution plan.

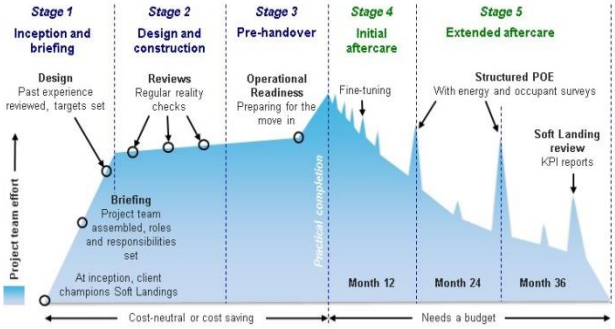

Figure 1 – Typical OR (Soft Landings) Approach

- Clearly define operational readiness needs and work activities at each stage gate. Assign responsibilities and deliverables required and ensure leadership support. The Operational Readiness Plan needs to be integrated into overall project plans as early as possible. This ensures conflicts are avoided before construction begins and silos are not allowed to form between operational and construction project teams.
- Establish an Operational Readiness steering committee. This team needs to include key project and construction team

members. The committee should include the Project Sponsor as strong leadership and decision making is required to move through any conflicts that arise as the project develops.

- The OR team need to start early on developing operating procedures necessary once the new project comes on line. In the Local Government environment this may include Bylaw reviews and modifications.
- Typically, operations teams are focused on operating a process that is stable and long standing. These skills are different from the skills required to develop procedures for safe operation / maintenance, startup and shutdown of the plant, and must be taken care of separately. Further the implications of new processes or procedures can have impacts further back in an organisation that may not be understood initially. Time to test the impact of new processes is also needed in the operating business.
- Ensure Safety in Design (SiD), Hazops and other asset criticality assessments are conducted as early in design and project phases as possible.

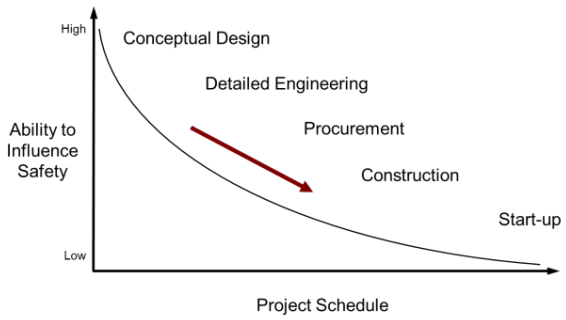

Figure 2 – Ability to influence Safety through Design Phases

These processes deliver the most benefit early in the project evolution cycle (see Figure 2 above) and this is when designs can be tuned to maximise value opportunities at the lowest cost.

The operational readiness analysis will also help identify the appropriate asset and maintenance management strategies to be deployed through the asset life.

Case Study 1 – CCC Wheelie Rollout

This Christchurch city wide project involved a major change to solid waste service levels across the city. The project involved the construction of a compost plant ($23M), a Material Recovery facility ($12M), procurement and delivery of 55 specialist collection vehicles and 480,000 wheelie bins ($38M).

Figure 3 – Kerbside Collection Fleet just prior to the start of services.

Service start-up was determined by the transition into new contracts, that once fixed could not easily be moved due to the large amount of messaging to the community.

OR thinking commenced at the inception of the project. Initial risk workshops pointed to the need for a highly integrated project team and early Contractor Involvement if project delivery timeframes were to be met.

CCC set up an OR team for the project. The team's key roles were associated with looking at contracting models, marketing of reuse products, communications and marketing, contract

management, procurement and preparation of the Council "back office" for the new service. Financial expertise was moved in at out of the core team as required. Additionally, the team participated in design reviews of key facilities, tender evaluation of key contracts, and many public meetings.

The size of the infrastructure roll-out required an integrated delivery framework that monitored manufacturing and construction of all facilities, storage and street delivery of wheelie bins. The bin manufacturers had to continually tune bin moulding times to ensure they met production schedules.

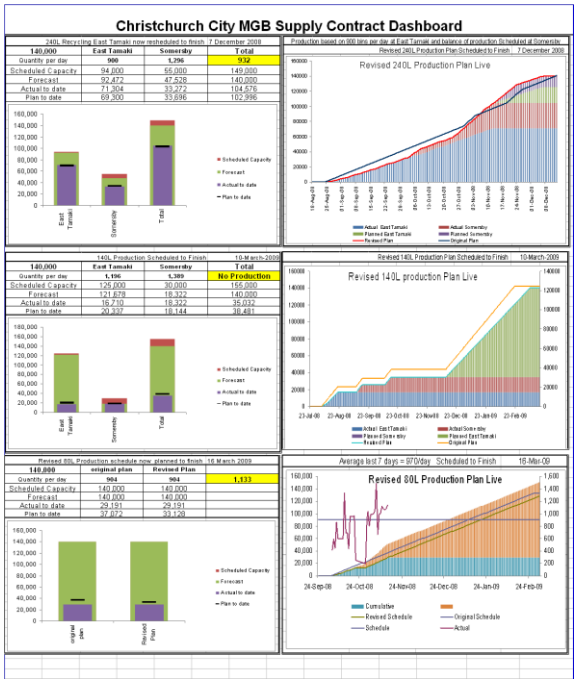

Figure 4 – Typical Daily Production reporting from Wheelie Bin Manufacturer as required by OR Team.

The OR team developed the communications plan and marketing resources for the roll-out of the services. This involved radio advertisements, billboards, truck signage and household user guides to enable rapid acceptance of the new services.

Figure 6 – Communications developed by OR Team for Roll out of Wheelie Bins

The OR team knew, from early international enquiries, that service level changes of this nature places considerable pressure on BAU Call Centre resources. This was anticipated and the OR team developed many FAQ's and new processes and procedures (including amendments to Bylaws) to enable the roll out of the service. The graph below illustrates the growth in service calls during the roll out period.

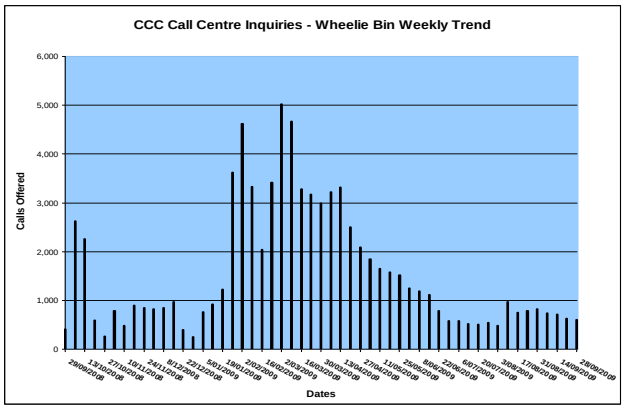

Figure 5 – Increase in Call Centre Volume due to new service roll out.

This large project successfully deployed an OR framework over a three year period (including a one year post start up review period). The table below illustrates the benefits bought to the project by this approach:

Project Element	Key Success Factor	OR Input
Compost Plant ($23M)	Delivered for $22.4M and on time for first delivery.	√
MRF ($12M)	Delivered for $11.7M and on time for first delivery (Just!)	√
Wheelie Bins and Trucks ($38M)	On budget and time. Incorporated marketing campaign inputs. Last bin delivered day before first collection for that customer.	√
Commissioning & Handover	Went smoothly and on time. Only minor issues to resolve	√
Call Centre	Managed call volumes	√
Marketing	People understood what they had to do.	√
Lost Value Engineering Opportunities	Nil	√
Business Case	On-going performance in line with Business case.	√

Table 1 – How OR Contributed to Waste Project Success

Whilst there are many factors that contribute to successful projects, deploying Operational Readiness methodologies on this project was a major contributor to the successful introduction of wheelie bin services in Christchurch.

Case Study 2 – CCC Botanic Gardens Visitor Centre

The Botanic Garden Visitor Centre is a 3000m^2 glass structure in the Christchurch Botanic Gardens. The Facility was designed to replace ageing infrastructure and bring together staff, horticulture and visitor facilities in an iconic design that would enhance the visitor experience and provide a strong visual entrance to the Gardens.

Figure 7 – Concept of Botanic Gardens Visitor Centre, Christchurch.

The project was Architect lead and did not deploy an OR work programme, although some operational staff were involved in design reviews and some value engineering sessions.

The project had a $13.5M budget in 2012 which grew to $16.48 M by the time the project was completed in late 2014.

Whilst OR methodologies may not have overcome all the cost escalation issues on this project the lack of a formal OR methodology meant that decisions on operational matters such as energy supplies and catering support to the facility were delayed and compromise

solutions had to be factored in at higher cost and with on-going operational implications.

Project Element	Key Success Factor	OR Input
Visitor Centre	22% budget overrun	✖
Sustainable heating initiative	Lost in initial design. Retrofit cost $0.5-$0.8M. On-going higher running costs due to having to use diesel has heating fuel.	✖
Optimised Life Cycle Costs	Maintenance costs higher. No initial business case model.	✖
Lost Value Engineering Opportunities	Several – heating solution most impactful. Issues with accessibility that required remedial works post commissioning.	✖
Back office support	Cafeteria design and catering support last minute inclusion led to sub-optimal solution.	✖

Table 2 – Lost Opportunities partially due to lack of an OR Methodology Deployment.

Whilst design reviews included some operational staff, key experts (asset management, building design) in the owners business were not utilised in some of the reviews and this would have provided a better outcome. The Council has had to modify toilet access and many of the doors in the facility because they were too heavy to operate.

A caterer for the facility was not appointed until very late in the construction programme. As a consequence the layout of the kitchen was not ideal for public operations. Further the late appointment meant that getting catering operations available for the opening was very difficult and required more resource than should have been necessary.

Originally the facility project team assumed reticulated landfill gas could be supplied to the facility. When this supply was sought it was found there was insufficient capacity and the Visitor Centre had to adopt diesel fired hot water boilers which are expensive to operate. Post commissioning CCC did look for a market solution to this issue but the transition cost to ground source heat pumps was too high (estimated at $0.5 to 0.8M). Any retrofit solution was also likely to lead to redundant assets that would have to be written off. Use of OR techniques early in the project would have identified this issue and resolved it in the design phase of the project.

During the commissioning period problems were experienced with the access doors and heating and cooling system control. A lot of energy was being consumed due to the heating and cooling systems fighting each other and this was due to ineffective commissioning of these systems. These issues were resolved post commissioning but at additional cost to the Council through further investigations, staff time and added fuel costs.

Conclusion

This paper has demonstrated the value brought to a project through the application of Operational Readiness methodologies.

Whilst the two case study projects have both delivered assets to Christchurch ratepayers that provide valued services the key differences can be summarised as:

- An opportunity was lost to optimise the energy solution for the botanic gardens facility. This is having on-going operational cost implications.
- Despite the intrusive nature of the solid waste project on every ratepayer in the City the roll out and service start up went very smoothly.
- The complex logistics of the solid waste project necessitated “Just in Time” commissioning of multiple facilities and activities. Without the operational and business pre-planning and communications work this would have failed.
- Opportunities to improve design features were lost on the Botanic Gardens Visitor Centre and facility commissioning was sub-optimal leading to unbudgeted operating costs in the operation of the new facility.
- The new waste services started on time and were managed within the operational budgets and manning levels defined during project development. The Botanic Garden Visitor Centre operating budgets had to be increased and substantial amounts of additional staff time were required to resolve site issues with the new facility. In a commercial venture the above shortcomings all lower the return on investment as presented in an initial business case upon which the investment decision is usually made.
- The waste project was delivered on time, to quality and slightly under project budgets. The Botanic Gardens project was not.

It is also worth noting that OR processes strongly support NAMS principles in optimising lifecycle costing of new assets and projects.

Everyone likes to be associated with successful projects. You can greatly improve your chances of being on the right side of project delivery by applying OR frameworks to your next large or complex project!

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References

Nil

Author Biography

Mark Christison has spent his working career managing, operating and maintaining water, solid waste, energy and vertical infrastructure assets in the public and private sectors. Mark spent 10 years managing the essential services (water, wastewater, storm water and solid waste services) for Christchurch City Council and was the Sponsor for the roll out of the solid waste project in Christchurch City. Mark has a passion for successful project delivery and particularly the smooth transition of new assets into operations.