
Assessing the Effectiveness of Key Performance Measures

Authors:

Alex Finn	Transportation Manager: Western Bay of Plenty District Council BSc(Civil Engineering) MIPENZ CPEng INTPE
David McDougall	Asset Manager: Inroads B.E.(Civil), B.Sc, MIPENZ, CPEng

Abstract

The 10 year performance based contract is a joint initiative between NZTA and WBOPDC for roading maintenance, and is about to enter its ninth year in the Western Bay of Plenty.

To prepare for the contract the WBOPDC (with the author's assistance) developed numerous Key Performance Measures (KPMs) as the main mechanism to ensure success in a lump sum environment, and places a strong community emphasis on local road maintenance.

Ten years on, this paper takes a big picture look at the current KPM's and how well they have influenced higher order outcomes for the clients.

It also discusses what other KPM's have been developed in the intervening years and how they have tracked over time. It discusses some of the challenges the industry still faces in ensuring success to all parties.

As this contract heads to its completion what additional KPM's could be added to improve the monitoring, long term understanding, and still ensure cost effectiveness clients interests are preserved in the long term.

Introduction

In this paper we will first describe the background that prompted the Western Bay of Plenty District Council (Council) to develop a Performance Based Contract and then we will discuss the Council's experience eight years down the line in the 10 year contract.

We will look at the Council's drive to get more from less, how it is being achieved, and develop an understanding of the risks involved. The paper discusses the effectiveness of key performance measures (KPMs) and focuses on measures that have required refinement during the course of the contract.

Background

In the late 1990's Western Bay was experiencing consistent growth around 5% and a growing backlog in infrastructure. Also the Council was driven to seek ways of making savings and encouraged innovation from staff to get more for less.

The solution chosen was to develop a lump sum performance-based contract. Although the lump-sum concept forms the basis of Performance Specified Maintenance Contracts (PSMC) used by New Zealand Transport Agency (NZTA), the Council's Performance Based Contract (PBC-01) has extended the concept to include most Council roading assets, and operations so as to maximise the opportunity of the contractor to derive benefits through innovation.

Characteristics of the contract are:

- Performance or Outcome based.
- Lump sum pricing with inflation adjustment, providing cost certainty.
- Risk transfer to the party best able to manage it.
- Transfer of operational decision making based on predetermined levels of service, which gives Council staff more time to focus on the strategic bigger picture overview, which has proved important in the rapidly growing area of Western Bay of Plenty.
- Engagement of a single service provider.

Development Of PBC-01

In the development of PBC-01, Council invested approximately \$3M in data gathering, condition assessment, risk identification, setting up how to measure performance over time, and the tender process. This was essential in order to ensure asset management results could be monitored by objective data on a cyclic basis.

The Council entered into a joint-principals contract with NZTA (Transit) so as to maximise efficiencies that could be derived from maintaining the whole of the herringbone road network, with the state highway forming the backbone, and share the benefits accruing from the economies of scale of the joint contract.

The table below shows the cost breakdown of the results of the tender:

	Engineering Estimate	Contract price for services	Forecast savings	
			Total	Split
Council services	\$135,350,000	\$105,015,077	\$30,334,923 (22% of estimate)	\$19M to Council \$11M NZTA
Transit services	\$39,500,000	\$33,210,513	\$6,289,487 (15.9% of estimate)	All \$6.289m to NZTA
All Services	\$174,850,000	\$138,225,590	\$36,624,410	

Considering the potential risks, extra effort and expense of entering into a previously untested Performance Based contracting structure, Council decided that it would only be justified if very significant savings were to be made.

Accordingly a tender hurdle was set at 93% of the estimate and the tender price came in at 78% of the estimate. That equates to roughly \$30 million over the 10 years from 2002 till 2012.

This saving was derived from the investment of \$3million, and has been used to accelerate Council's seal extension programme, which amounts to 100km over the 10 years.

So financially, we are satisfied we are paying less. The next question is, are we getting more?

Setting Performance Measures

The most important task in the performance based contract was setting the levels of service right.

Setting up performance levels forces the principal to make a thorough assessment of what is necessary and affordable to meet the requirements of customers, and to ensure long term sustainability of the asset.

If levels of service are too high, resources may be directed to tasks that are unnecessary and do not contribute to customer satisfaction or the long term benefit of the asset.

In the case of the Council, the KPMs have been set on a par, or an improving or decreasing level dependant on the age distribution at the beginning of the contract, or on whether the existing state matched what is considered appropriate. In the PBC-01, we have in excess of 25 asset groups of key performance measures (KPMs) and Operational Performance Measures (OPMs). After 8 years, we are confident that the contract's outcomes are based on sustainable management.

In summary

- Asset management understanding has improved through improved inventory data collection and analysis.
- Specified levels of service have been attained or exceeded.
- Costs have been contained.
- Effects of growth have been accommodated.
- Optimised effort between asset groups has been possible.
- The contractor has been consistently meeting their obligations so we are confident we are getting more.

Using Performance Measures To The Client's Advantage

The client needs to set up the key performance measures to provide the greatest advantage to its customers, being least whole of life cost.

The following have provided Council the opportunity to derive significant savings:

(Each one could provide a subject for a paper on its own)

Increased tendering interest: The scale and length of the contract will attract increased competition in tender process. However the principal must beware of under-pricing by contractors who may outbid more suitable tenderers through not understanding the scope of the contract or are over-optimistic in what they hope to achieve in deriving savings from innovation and other efficiencies. Accepting an underpriced tender for a long term contract will result in the contractor constantly testing the boundaries, under-achieving and exploiting every possible weakness in the contract documentation.

Economy of scale: The contractor has the opportunity to deploy resources efficiently and retain a multi-skilled workforce. These types of savings can be derived by any type of contract where the scope can be extended to cover a number of similar activities or where the clustering of principals is possible.

Contract period: By extending the contract period, the client provides the opportunity for the contractor to invest in better resources than would be the case for a short term contract. There is opportunity for the contractor to invest in the asset so as to reduce longer term maintenance costs. Moreover the contractor is able to recruit and retain high value staff who due to family reasons, will not normally be employed in the contracting environment.

Risk allocation: The nature of the contract allows for the allocation of risk where it can be managed most efficiently. Risks close to the workforce are most apparent to the contractor and the contract should be set such that the results of a failure to respond or protect the asset impact on the contractor, not the principal. On the other hand, risks which cannot be managed by the contractor should be the client's, otherwise the price will be loaded or subject to dispute if the risk materialises later in the contract period.

Network ownership: The nature of the contract will motivate the contractor to look after the asset for the principal and manage conflicts between subcontractors or other network users. In the case of PBC-01, the contractor manages road opening applications.

Definition of levels of service: This is the important attribute of the performance based contract. It ensures that the principal defines what is required, in order to derive the greatest value for money and delivers what your community wants and is willing to pay for. The levels of service can be related easily to the Council's high level outcomes, and can be benchmarked.

The contractor's obligations are set out in the terms of operational performance measures and key performance measures. These measures must be SMART:

- Specific
- Measurable
- Attainable
- Results orientated
- Time Based

In other words measures must be objective, or where a qualitative assessment is made, there must be clearly defined terms describing asset condition and performance.

The measures must clearly set out what is expected and drive the contractor towards appropriate behaviour.

What Has Worked?

Overall, PBC-01 has worked in that it has provided more for less.

In taking stock of asset condition we can be assured of the following:

- Average road roughness has improved.
- Smooth travel exposure has improved.
- Surface condition (SDI) has improved.
- Condition of ancillary assets and structures has improved.
- Provision and efficiency of street lighting has improved.
- Roads are safer than peer group local authorities.
- Customer service has improved.

In terms of operational performance measures we know that defects have been attended to within contract requirements. Like any other authority, the Council does receive complaints from residents who will simply not be satisfied. However the

level of data available can easily refute arguments about deteriorating service and supports informed debate on affordability of increasing levels of service where this may be warranted.

What Has Not Worked?

Dust KPM

The dust KPM was set to ensure the aggregate sources had low rates of dust generation. Attempts to measure and specify the level of dust generation however have not succeeded. While various methods of measurement have been attempted, variations in moisture content on the road surface, and the vagaries of the weather have made it difficult to measure consistent results. However the use of suitable clay binders, available only at certain quarries, has allowed the contractor to provide a bound surface on unsealed roads. This has minimised but not eliminated the amount of dust produced on the unsealed portion of the network.

Sealed Road Width KPM

This KPM was based on the length of road as a function of ADT and the width deficiency squared (based on the Council's Standards).

Generally the measure has worked to prioritise which lengths need to be constructed, but because of the weighting of the width component, it was found that the contractor gained most benefits by focussing on the most under-width road. On the face of it this approach may be considered desirable, but the outcome was that roads which were more difficult to widen, that is narrow and widening in mountainous areas, were overlooked in favour of long straight roads where the KPM could be met at least cost. This KPM has been dropped in favour of widening roads selected on a similar basis, but with client input so as to maximise safety outcomes.

Streetlighting

This KPM was based on average lux across communities, with specified maximum levels to eliminate the use of inappropriate high-powered luminaires.

The average lux was set to drive the maintenance practice of cleaning and replacing old and fading mercury vapour lights and removing vegetation that obscures the lights. Generally this approach has worked, but in some locations has indicated a requirement to install new lights where existing lights are only marginally in excess of the required distance apart. This is not always desirable. Also the measurements have in cases proved unreliable and further work is in progress in order to reach a satisfactory measurement method to ensure the required outcome.

What About The Big Ticket items?

The major roading expenditure items in most RCA's budgets are pavement renewals and resealing. These items receive some extended coverage in the Appendix to this report, and a summary is presented here.

Seal Residual Life

In the PBC Contract, the KPM's that ensure the sealed surface remains effective are primarily covered in the texture, surfacing defects index and Residual Seal life. The former two have behaved largely as expected, ensuring reseals are triggering at about the right levels. The Residual Seal Life KPM has had some closer scrutiny placed on it as it can promote unnecessary resealing in some instances. There has been an effort to gain more understanding of extracting better value and efficiency over a pavement's whole of life. In this regards refer to the Appendix for details.

In summary, we now maintain that the "best for network" philosophy can promote a relatively "aged" seal network (in appropriate circumstances) and that savings over its whole of life can be realised by this KPM being flexible. It must go hand in hand with a targeted maintenance intervention strategy and an accurately focused monitoring regime that ensures a quick response at the first signs of seal distress, in order to avoid a more costly pavement repair.

Pavement Residual Life

In most PSMC or PBC type contracts the responsibility for both design and reconstruction work resides with the contractor, who must demonstrate that a 25 year design life has been achieved. Our PBC has an additional structural condition survey over the network aimed to ensure that consumption of pavement life by traffic is matched by new construction and as measured by falling weight deflectometer (FWD) surveys.

However it is our experience that the FWD is not a conclusive enough test to verify or predict residual life. This has been confirmed in the December 2009 Research Report 381 by NZTA entitled "Compliance Testing using the FWD for Pavement Construction, Rehabilitation and AWT's". This is compounded in the WBoP due to the high deflections observed in adequately performing volcanic ash subgrades.

While FWD may assist in determining relative areas of concern (i.e. soft spots), the varied results we have experienced and the ease with which a pavement can pass these tests in our area, has led to a certain amount of scepticism in the FWD results being a strong indicator of residual life.

Further, even if we did have confidence in the FWD results, due to the process of design outlined in the Appendix, it can only verify the design inputs post production, not pavement performance post production.

This has led us to rely more on inputs such as robust design criteria and detailed Quality Control during construction, which are not output or performance based in essence. However as pavement reconstruction is approximately 25% of our budget and at these levels other maintenance still dominates, it is not unreasonable to continue to include pavement reconstruction in these contracts, considering the gains in maintenance efficiency that can be observed.

A better option going forward into the next contract may be to include pavement life assessed by rut progression and roughness progression. This approach really requires a long period of time to be truly effective, with a contract period closer to that of the pavement life (say 25 years) or even an evergreen (i.e. potentially continuous) type contract model.

Regardless of the arguments of extending the contract period beyond ten years, provided the RCA continues in a performance based type contract at each change, their risk of the consequences of inadequate actual residual life pavements is reduced. However the new custodian (i.e. the new PBC Contractor) will inherit the consequences of previous custodians' decisions, their quality of construction, and their maintenance intervention strategies.

Contract Culture

Contract Governance

The contract's governance is conducted through a board made up of the two principal's and two contractor's representatives. These four board members have senior roles within their respective organisations and are not involved in daily operational delivery.

Some of the critical success factors that are crucial for overall success are not currently covered by any Performance Measure, but are managed at a high level through balanced score card reporting.

Team culture

Tendering the contract successfully is only the first hurdle in providing a satisfactory outcome. What follows may compromise the success of the contract. Both the contractor and the principal need to have the mindset that the contract provisions are secondary to achieving what is best for the network, and the ultimate goal of achieving a successful outcome to the contract. At the same time, the principal needs to foster a team culture in a mutually supportive team which includes the contractor's staff and accept that the contractor is entitled to a profit. It is for this reason that under-pricing constitutes such a major risk in the tendering process. Council's contract manager needs to have the skills, experience and maturity to be able to persuade his management and elected members, that the lowest price, although vital to create competitive tension and a drive for innovation, may not always deliver best long term value.

Assuming that a sustainable long term contract is set in place, the inevitable contractual disagreements must be settled on a win-win basis without destroying constructive working relationships. The PBC-01 has a process of minor and major non-compliance thresholds to ensure contract management remains targeted and effective.

Once the team can rise above the daily grind of contractual issues, there is time to work together to develop innovations and enhance the service provided to customers. This is not to say that PBC-01 or any other performance contract is based on warm and fluffy platitudes. On the contrary it is objective and data-specific, driven by clearly articulated outcomes.

Customer Care Outcome

It is vital that the contractor's team and Council's staff manage customer expectations as a team. The nature of the contract eases the burden of demonstrating that customers are getting what they pay for, and anything better will imply an increase in rates. The formation of a dedicated communication team, integrated with the contractor's team has ensured that the Council's customers have received up-to-date and correct information directly off the contractor's operational systems. In the case of PBC-01 customer service requests are directed to the customer service staff of the contractor. All requests are tracked in terms of responses to customer, whether faults are already recorded by contractor's staff through routine inspections, and whether the response to the request is completed within contractual time frames.

In Conclusion

Perception is reality, and it is important that claims of success need to be demonstrated through hard data. The PBC-01 by its very nature affirms the success of the contract by the fact that the contractor has consistently met or exceeded the KPM requirements. The Council has also reduced the cost of its services, mitigated the effects of growth and reallocated some major areas of its risk to the Contractor. The elected members of Council have endorsed the success of the contract by approving a draft procurement strategy that effectively seeks to roll over or renegotiate the current contract with the incumbent on an evergreen basis. This of course, is subject to consultation and NZTA approval.

In conclusion, we at Western Bay of Plenty District Council believe the PBC-01 can be held up as a success, and this paper will hopefully provide an incentive for other authorities to look at performance based contracting as a means to get more from less.

