

Scrim And Texture Data Collection Contract Management S Chamberlain

Introduction

Transit New Zealand (Transit) has been successfully managing SCRIM and texture data collection through external suppliers for a number of years now. A fairly prescriptive procurement model has been used to manage both the technical complexity of the contracts and the risk carried by Transit in the event usable data is not delivered.

Within the procurement model the contractor, consultant and client have distinct roles that work together to make the project a success. Transit's asset managers are able to rely on the annual availability of accurate road surface data with which they can make critical investment decisions.

Open and clear lines of communication engender trust between contracted parties and further strengthens the ability of the team to deliver quality data each year.

Procurement Model

The choice of procurement model to capture, analyse and report SCRIM and texture data across New Zealand's state highways was heavily influenced by the complexity of the process, the availability of in house technical expertise and the level of risk Transit is exposed to.

Transit is an organisation made up primarily of project managers, although there are now increasing numbers of technical specialists. When collection of road surface data became an integral part of asset management it was felt that delivery of robust data was dependent on the engagement of a technical expert. For Transit, this meant the commissioning of a specialist consultant was essential. This immediately led Transit to consider adopting a traditional procurement model.

In addition consideration was given to the complexity of the data collection, the uniqueness of the equipment required to collect the data and the need to comply with stringent validation and calibration specifications. Transit's level of risk exposure was also deemed to be high, particularly where maintenance of a safe road network relied on timely and accurate SCRIM and texture data.

The traditional model involves a delivery structure with professional services contract for the management, surveillance and quality assurance of the physical works and a separate contract for the physical works.

Transit's most recent contracts were tendered in 2002 to cover the whole state highway network. Both the professional services and physical works are three year contracts with provision to roll over a further two years conditional upon adequate performance. The longer contract period allows the contractor to invest in plant, if necessary, pre contract commencement with the security of five years of income.

The contracts themselves are both paid on unit rates, which means Transit retains the risk of quantities. It also gives the needed flexibility when adjustments are made to the make up of the state highway network.

Physical Works Contract

The physical works contract is for the annual collection of skid resistance (SCRIM) and texture data on the entire New Zealand state highway network (approximately 22 lane kilometres). Also included in the contract is the collection of GPS and geometry data, collection of a network video, equipment calibration and validation, data processing and compliance monitoring and reporting. The particular contract Transit runs currently combines the SCRIM and texture data collection with a pavement condition survey (roughness and rutting).

As part of the network survey there are approximately 52 benchmark sites and a further series of seasonal correction sites. In addition Transit welcomes Local Authorities to approach them with a view to surveying local road networks. Each year a number of Local Authorities do approach Transit and the contractor picks up these networks at the completion of the state highway survey. The Local Authority pays very reasonable survey rates, which would not be enjoyed should individual Local Authorities seek to engage their own data collection surveys.

The physical works specification is broken into distinct activities:

1. Management Requirements
2. Equipment (specifications, calibration and validation)
3. Road Condition Surveys
4. Data Reporting
5. Performance Appraisal

Each is discussed below.

Management Requirements

The contractor is required to prepare a contract quality plan to integrate the contract document requirements with the contractor's quality, health and safety and environmental management systems. The initial contract quality plan is submitted at contract commencement and then reviewed and updated on an annual basis.

The contractor prepares an annual survey programme. This has two objectives. The first is to ensure that the survey and reporting will be completed within contractual time frames (which are dictated by Transit's need for the data – for example, confirming sealing programmes). The second objective of the programme is to provide Transit's regions with the date the survey will be undertaken in their area. This is important in terms of traffic management impacts and assessing when the data will be available to confirm maintenance programmes.

Perhaps the most critical management requirement, certainly in terms of meeting the programme, is the development and approval of traffic management plans. The contractor prepares a nationwide, generic traffic management plan, which must be

approved by the Engineer to the Contract. The generic plans are then reviewed and finalised for local conditions in consultation with individual network managers.

Generating the specific traffic management plans is, at least in the first year, a complex task, but it is vital for the safe passage of the survey vehicle and other road users on the network. Local conditions will often include restrictions on hours of work (for example night time work only on the motorways) or days when no work can be undertaken (for example on public holidays).

Equipment

The contractor cannot begin the annual survey until all calibration and validation requirements have been met.

The purpose of equipment calibration is to:

- a) Ensure satisfactory repeatability and reproducibility of the measurements by trace ability to international standards
- b) Ensure the equipment can measure the data elements to the accuracy defined in the specification
- c) Provide evidence of continuing measurement stability
- d) Define any limitations of the equipment such as minimum operating speed
- e) Define factors influencing the results such as filtering of data, and how the correction procedures for these factors are applied.

Annual and daily calibration criteria are set.

Equipment validation is undertaken at the beginning of the survey season and then repeated at monthly intervals. The validation is required to:

- a) Confirm the proposed measurements methodology will provide data in the format and to the quality specified
- b) Maintain consistency of results

Validation sites are selected for each measurement parameter. The sites are agreed with the Engineer and marked on the network for repeat validation purposes. Statistical measures are specified to demonstrate the equipment meets the acceptance criteria specified for each function (for example repeatability and bias).

Road Condition Surveys

Specific requirements are set out for each road condition survey. The more important requirements cover water supply for the SCRIM machine, the locational accuracy required, benchmark monitoring site surveys, seasonal control sites and the network video.

Benchmark monitoring sites have been established as long term performance monitoring sections to monitor deterioration and for calibration of deterioration models. These sites are surveyed annually at the same time each year.

Seasonal correction factors are applied to the SCRIM data to acknowledge the influence of varying climatic conditions. The sites are predetermined but are regularly assessed to ensure they are giving the best results.

The contract also requires the contractor to record a video of the entire network. This was first completed last season and has proved extremely valuable in managing the asset. It is likely that update videos will become an annual deliverable.

Data Reporting

Two levels of data reporting are required. Raw data is the record of the individual measurements recorded by the equipment. Detailed data is the processed raw data summarised to 20m intervals and is provided in a form that can be loaded into Transit's Road Assessment and Maintenance Management (RAMM) database.

To determine areas of low skid resistance and texture, SCRIM Exception Reports are produced. These report the locations where the SCRIM Friction Coefficient (SFC) is greater than 0.1 SFC below the site investigatory level (which varies depending on site category). The report also highlights sites where Mean Profile Depth (MPD) is less than given threshold levels. A photographic log of each type of deficient site (where either SFC or MPD is below threshold) is part of the exception reporting.

Performance Appraisal

There are two reasons why an assessment of contractor's performance is made. The first is to determine whether the roll over years of the contract should be awarded. The second is to determine the contractors overall track record, to be used for tender evaluating purposes in the future.

The award of roll over years is made up of various factors relating to contract deliverables plus a subjective component from the consultant and Transit. Each factor is weighted and then summed to a total of 100. A score of 80 or more results in the roll over being awarded.

Track record is assessed using Transit's Performance Assessment by Coordinated Evaluation (PACE) system. The consultant rates the contractors performance over a range of factors identified as important to Transits (loosely covered by quality, time and budget). The scoring is then discussed with the contractor before being entered into the database. The contractors track record, a component of all Transit's tender evaluations, can then be determined from an amalgamation of all their final PACE records. Final PACE assessments are made at the completion of the contract. Intermediate assessments are made twice annually and assist in identifying areas for improvement.

Professional Services Contract

Under the traditional procurement model the consultant is contracted to take the role of physical works contract manager, in the same way consultants are engaged during road construction physical works. The full role covers management, surveillance and

quality assurance (MS&QA). In essence the consultant acts as Transit's eyes and ears for whatever the contractor is doing.

Contract Details

While Transit and consultant are bound contractually there are no direct contractual links between the consultant and contractor, although the Engineer to Contract and Engineers Representative do have contractual roles (refer NZS 3910). Transit has engaged the consultant on a three year contract with provision for two, one year rollovers. This aligns with the physical works contract and ensures the relationship established between suppliers is maintained over the longest possible period without interruption.

Consultant Approvals

The consultant has the responsibility to issue approvals at certain hold points in the physical works contract. These hold points include:

1. commencement of the survey after calibration and validation
2. development of the traffic management plans
3. acceptance of the surveyed data
4. issue of the detailed data

Transit will only approve progress to the next step in the collection/ reporting process once the consultant has recommended that it is appropriate to do so. Before issuing a recommendation to progress there may have been several exchanges of information between consultant and contractor.

Direction to the Contractor

Instructions to the contractor are made directly by the consultant or from Transit via the consultant. Transit's line of communication to the contractor is therefore somewhat limited but adhering to the contractual protocols ensures the consultant is always in the loop, that adequate records are kept and the status of the instructions are never ambiguous.

Technical Advice

Transit relies on the consultant for technical advice, particularly in relation to the hold points listed above, but also when research is being undertaken or problems are encountered. The consultant's personnel are fully conversant with the technical aspects of the survey, although some focus entirely on detailed issues and others have a broader responsibility. The consultant's team leader must be able to converse at a technical level and contract management level. Good communication and reporting skills are vital for the team leaders role.

Reporting

Apart from the day to day communications, usually on a relatively informal basis, the consultant must submit formal monthly progress reports. These detail work completed

in the previous month, work programmed for the current month, exceptions and outstanding issues, a track of financial progress and a summary of the contractors monthly report. While the contractor is actually surveying, brief weekly reports are also submitted.

In conjunction with reporting financial progress the consultant certifies the contractors monthly claim and reports accruals to Transit. They are also responsible for forecasting the year end spend and the monthly cashflow, plus negotiating and approving variations to the physical works contract.

Research

Research is undertaken on varying topics each year. Priorities are set at the outset of the season and results collated once the survey season has finished. The consultant coordinates all the research and provides specialist input into methodologies and data analysis. A continual programme of research allows innovation and improvement to be integral to the data collection project.

Day to Day Responsibilities

In addition to specific responsibilities at certain stages of the survey the consultant responds to queries, whether technical or contractual, from Transit staff across the country, Local Authorities, network management and maintenance suppliers and road users. They arrange meetings between Transit, contractor and themselves and ensure resulting actions are documented and completed within the agreed timeframes.

At the end of each survey season the consultant receives the data from the contractor and carries out a review to ensure quality and accuracy. They are then responsible for ensuring the processed data is distributed to each of Transit's regional offices. The consultant also fields queries relating to the data.

Performance Appraisal

The consultant is subject to performance appraisals in the same way the contractor is but it is Transit who undertakes the assessment.

Client Role

Transit has chosen to break its role into two areas of management – technical and contractual.

Contract management focuses on:

1. delivering the project within reasonable bounds of the annual allocation and contract award prices
2. tracking deliverables as they are due
3. liaising with the consultant
4. assessing and approving (where appropriate) variations to contract
5. communicating with the regional offices

6. communication with external stakeholders (for example the Police)
7. contract documentation and supplier selection for the next round of contracts

Technical management focuses on:

1. data integrity, quality and accuracy
2. identification and specification of research
3. receiving and uploading the data into RAMM
4. data use and limitations
5. improvements to the way data is collected, processed or reported

The two management roles are closely aligned and can only be made successful through frequent communication.

With two good, reliable suppliers on board the clients role is minimised. Even decision making can be straightforward when options and recommendations are presented in a clear and concise manner.

Communication

The role of good communication and a strong working relationship between suppliers and client cannot be underestimated as a factor in successful contract management. Transit believes it has achieved both in its SCRIM and texture data collection contracts and has reaped the benefits for several years.

Procurement

Communication starts with the tender documents. A clear scope of works combined with realistic quality expectations allows tenderers to submit bids that adequately cover their costs and risk exposure. A tender selection process that focuses on quality rather than price alleviates price tension that could later constrain the relationship.

Formal Reporting

On going and regular communication after contract award is essential to each parties understanding of priorities and expectations. Formal reporting from the consultant to the client is recommended on a monthly basis at a minimum. This should be supplemented with more frequent reports while the data collection equipment is out on the network. The contractor should also be required to submit formal reports to the consultant on a similar time interval.

Meetings

Regular meetings are a good way to keep up to date but difficult logistically when the data collection equipment is out on the road. This can be compounded when the consultant is not in the same location as the client (as could be expected for a national contract). Transit experiences this very scenario so limits meetings to the start and end of the season. These meetings tend to be long but they are invaluable in terms of alignment. Last year Transit also held a later meeting to discuss research proposals for

the following season. The idea being that funding and methodologies could be agreed prior to the survey starting, giving a chance to programme the research realistically.

Informal Communication

Informal communication fills the gap between monthly reports and meetings. Transit relies on informal means of communication, by email or phone, to keep right up to date with progress in the field. A good rapport has been established between Transit and its consultant. This significantly reduces any possible frictions between the two parties and builds valuable trust in the consultant.

Summary

Successful contract management relies on robust documentation, clear roles and responsibilities, appropriate supplier selection methods and open lines of communication. These factors are no different for the management of SCRIM and texture data collection contracts.

Transit has been able to make critical asset management decisions based on accurate road surface data for a number of years. This has been achieved through the careful management of external suppliers who have, in turn, provided Transit with an excellent service.