When to use the Toolkit

The Diagnostic Toolkit has the potential to either be used as required when clients or other stakeholders believe that their project is not performing according to expectations; or at regular intervals during the life of a project to assess its health and likely success. When used on a regular basis, much of the data for the Toolkit can be collected concurrently with data collection for project status reports. It can be used for all project phases, project sizes and many procurement methods.

Why use the Toolkit?

- INTEGRATED BENEFITS: The Toolkit is a three-in-one package that identifies areas of poor project health, pinpoints the root causes and identifies remedial measures.
- RESEARCH BASED: The development of the Toolkit involved rigorous academic review with literature from industry and research institutes in UK, USA, Europe and Australia and is being comprehensively validated using many real-life projects of differing sizes, with various procurement methods and at different stages.
- ECONOMICAL: The cost associated with using the Toolkit is very small when compared with those costs related to the adverse impacts of failing projects, including cost and time overruns, inadequate build quality, poor project relationships, loss of reputation, public clamour and legal disputation.
- RELEVANT: The Toolkit is based on a cyclic mechanism that repeats the investigation until the problems are remedied. It is dependent on benchmarks for performance evaluation, most of which are based on industry standards. The Toolkit has the provision for updating these benchmarks as required.
- EASY TO IMPLEMENT: An independent and objective team is needed to implement the Toolkit.



References

Rockart, (1979). "Chief executives define their business needs" quoted in Veen Dirks, (2002). "Strategic Control: Long range planning, Meshing Critical Success Factors", 34(4).

Cole, (2003), First Report of the Royal Commission into the Building and Construction Industry, Royal Commission into the Building and Construction Industry, Melbourne, Australia.

cbpp, (2003) "Construction Industry Key Performance Indicators" UK.

CII / ECI, 'Contractor guestionnaire version 7.0 http://www.cii-benchmarking.org/ (accessed 2/10/03)

Humphreys, Mian, Sidwell (2004) "A Model for Assessing and Correcting Construction Project Health", International Symposium of the CIB W92 on Procurement Systems, Chennai, India.

Value in Project Delivery Systems Project Diagnostics (Project 2002-052-C)

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Value in **Project Delivery Systems**

PROJECT DIAGNOSTICS Toolkit for assessing health of construction projects

The Diagnostic Toolkit, a research project of the Cooperative Research Centre for Construction Innovation. is a potential lifeline for clients and industry stakeholders wishing to improve outcomes through better project delivery.

This powerful and unique toolkit will enable the user to: · investigate the health of a

- construction project
- · identify the root causes of poor health

 identify remedial measures to be implemented to improve project performance and outcomes.



The Diagnostic Toolkit Why was it needed?

There is no shortage of public reports and commentary about projects that fail to meet predetermined objectives. The consequences of failure include such adverse impacts as cost and time overruns, inadequate build quality, poor project relationships, loss of reputation, public clamour and legal disputation. Poorly performing projects can also attract unwanted publicity, particularly those which are publicly funded and have a high profile.

Despite the availability of a large number of published reports, reviews and research treatises providing guidance for successful project execution, many do not use the solutions they offer. The industry continues to suffer from projects failing to achieve basic outcomes expected by key stakeholders.

The Diagnostics Toolkit will improve the chances of project success by assessing current project condition, identifying the reasons why a project may not be performing as expected, and suggesting a means of rectifying the project to ensure successful completion. The concept evolved from a health care model that uses symptoms to evaluate human health and diagnose causes of problems and makes preliminary recommendations of remedies for a return to good health.

To develop a useful and practical program the Toolkit needed to:

- to identify poor health in construction projects
- apply to a broad range of project sizes and phases
- rapidly and accurately diagnose problems
- suit integration of remedies to return the project to good health.



The Diagnostic Toolkit How does it work?

The Diagnostic Toolkit uses Critical Success Factors (CSFs) to assess project health in an unconventional way. In 1979, Rockart first introduced the idea of CSFs, and defined them as those aspects which, if successfully managed, can significantly influence the success of a project. Traditionally, CSFs are regarded as the ingredients needed to give the best chance of a successful project outcome. The Diagnostic Toolkit critically assesses whether the CSFs are on track for project success or leading to failure.

To use CSFs as an indication of health, detailed assessment of individual factors is critical. Achieving this required the development of an associated list of Key Performance Indicators (KPIs) for each CSF.

CSFs found in poor health can be investigated in detail to determine the causes of poor project health identified by Contributing Factors (CFs). Lists of CFs associated with each CSF were developed through a detailed literature review and in consultation with industry

The Methodology Cycle



Identification of Contributing Factors (CFs) for the Toolkit – Pilot study

through pilot case studies. Like CSFs, the CFs are assessed to pinpoint the areas most likely to be causing poor project health. A series of Secondary Performance Indicators (SPIs) for each CF are used to determine this. To facilitate and validate the application of KPIs and SPIs in the assessment of CSFs and CFs, calibration was conducted using benchmarks from Australia (Cole, 2003), the UK (cbpp, 2003) and the USA (CII/ECI, 2003).

Correct and timely identification of CFs, along with accurate assessment of SPIs will allow effective, focused remedies to be identified. The aim of the remedies is to return the project to good health. To achieve a successful outcome, coordination of all stakeholders is important and is a time-consuming, yet critical process (Humphreys, Mian, Sidwell, 2004). The implementation of specific remedies is the most important step towards bringing a project back to good health.

It is essential that monitoring be conducted to ensure that the remedies are working as planned.

The methodology cycle described is shown below:

The pilot study facilitated the identification of 22 main CFs to cost overrun. 18 to time overrun, 31 to increased number of RFIs, 31 to increased rework, 4 to diminished safety, 28 to poor contractual relationships, 10 to environmental non-conformance, and 14 to a reduction in stakeholder value.

KPI Easi Broa

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A total of 28 interviews were conducted on seven different projects for the pilot study. These interviews used a structured questionnaire and respondents included clients, consultants, contractors and subcontractors. Projects covered a variety of procurement methods including design and build, lump sum and schedule of rates and the majority of projects were valued at more than A\$10 million. The main aim of the pilot study was to identify the factors that can contribute to project failure under the seven CSF themes of Cost, Time, Safety, Quality, Environment, Stakeholder Value and Relationships.

Data analysis of the pilot study revealed the limitation of having only successful projects available for the pilot study - the data collected was not sufficient to encompass all the factors that contribute to the potential failure of construction projects. It was proposed to use these CFs in conjunction with CFs identified through the literature review. This will increase the robustness of the Toolkit.

Toolkit validation – Case studies

The Toolkit validation process was split into two stages. Three projects from Queensland and one international project were used in the first stage to check the robustness of the KPIs against criteria that immediately assessed the health of a project. KPIs were tested and selected against the following criteria:

characteristic	Description
y measurable	Data should be readily available. Indicators should be able to be measured quickly, directly and accurately with minimal effort.
dly applicable	Indicators should be able to be measured at any stage of a project or at least a combination of indicators across a CSF should be able to represent all stages of a project. The indicators should also be able to represent different procurement methods and be independent of project size.
itive	The indicator must be conclusive.
ssable	Indicators should be able to be benchmarked against a known quantity to assess its performance.
pendent	An indicator is specifically used to represent a CSF and is not duplicated with other KPIs within a CSF.
ct reality	The intention is to encourage descriptions of realistic practice rather than 'ideal' situations that in practice do not occur.