
Capability maturity model for maintenance management

CAPABILITY MATURITY MODEL
FOR MAINTENANCE MANAGEMENT

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FOREWORD

In support of industry's requirement to improve safety, reliability and availability through improving installation integrity, this Capability Maturity Model for Maintenance Management (C4M) procedure has been developed to assist duty holders and contractors to assess and where needed, improve the efficacy of their maintenance organisation.

The model is effectively an auditing tool which enables the assessor to provide a profile of the strengths and weaknesses of the core and supporting processes associated with the maintenance function and to identify the steps that can improve reliability through improved organisational performance. It therefore provides methods for duty holders and contractors alike, to self-assess the key issues affecting maintenance performance from the perspective of those undertaking the maintenance work.

During development of this model the experience gained from previous maturity models developed for the Health and Safety Executive (HSE) and duty holders for use in other specific parts of the industry has been incorporated.

It is expected that C4M can also assist managers by providing information as a 'leading' key performance indicator.

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Health & Safety Executive
Petrofac Facilities Management Limited
Shell UK Exploration & Production
Talisman Energy (UK) Limited

The JIP was directed by a Steering Group comprising expert representatives from the sponsors. The following list includes all of those who have been involved in the JIP Steering Group either throughout the whole project or at various stages:

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Affiliations refer to the time of participation.

The JIP Manager and Chairman was Keith Hart (Energy Institute).

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John Wintle	TWI Limited
John Sharp	Cranfield University
David Galbraith	Poseidon
Ed Terry	Sauf Consulting

INTRODUCTION

1.1 PURPOSE OF THE PROJECT

The management of the maintenance of equipment and structures used for oil and gas exploration, production and refining continues to be an area where the industry is seeking to improve its performance. The industry is well aware of the impact of inefficient or ineffective maintenance on the reliability of systems essential for ensuring safety and production, and the costs and hazards of maintenance outage. This project report presents a model from which companies can assess the maturity of their capability to manage maintenance, and know the steps they need to take in order to move to a different level.

The capability maturity model (CMM) describes five levels of company culture and approach towards the different processes of maintenance management. It enables the user to recognise which description best fits their company's culture and approach and what is needed to move to a higher level of maturity. While moving to a higher level of maturity will often bring about improvements in effectiveness and efficiency, companies must decide themselves what maturity level is right within their commercial and operating environment.

1.2 RELEVANCE, APPLICABILITY AND BENEFITS

The model will be useful to managers with responsibility for operations and maintenance of equipment and structures used for oil and gas

exploration, production and refining. This may involve oil majors and operators, turnkey maintenance contractors and their supply chains. Verification agencies and regulatory bodies may also find the model useful as it will enable them to more easily assess the company operations that they are inspecting.

The focus of the model has been with offshore structures and top-side equipment at installations in the UK sector of the North Sea in mind. The model also has application to the management of maintenance for many other parts of the industry, including on-shore refineries, although some of the logistical and management issues will have different importance. It can also be used to assess maintenance in different geographical regions, noting that the model has been based on the principles of UK safety management culture.

The model is intended as a tool that will help companies and their supply chain improve their maintenance management processes and optimise the condition and reliability of their structures and equipment for safety and production. It will help them to think how the responsibilities for maintenance management are divided in their own operation, and assess the effectiveness by which each process is being undertaken. As organisations become more mature, they learn from their own experience and that of the industry as a whole and adapt their management, culture and processes to address the challenges foreseen ahead. Thus, the model is a way of measuring the ability of organisations to learn from experience, to anticipate the future, and to evolve themselves and their supply chains.

1.3 PROJECT MANAGEMENT AND SPONSOR GROUP

The project was undertaken for a Sponsor Group as a Joint Industry Project managed by the Energy Institute, which contracted the technical work to a consortium of consultants. The Sponsor Group of five organisations included representatives from BP, Shell, Talisman Oil, Petrofac Facilities Management and the UK Health and Safety Executive. The consortium undertaking the technical work comprised the following consultants:

John Wintle	TWI (Consortium Manager)
Professor John Sharp	Cranfield University
David Galbraith	Poseidon
Ed Terry	Sauf Consulting

The Project Manager was Keith Hart of the Energy Institute. Development of the model took place between September 2005 and September 2007, and benefitted from discussions at meetings of the Sponsor Group held approximately every quarter. The model was tested in trials with selected members of the Sponsor Group, and modified accordingly.

1.4 STRUCTURE OF THE REPORT

The report is in eight sections plus Appendices. After this introduction, the current context of maintenance management is discussed, particularly as it relates to offshore installations. Section 2 also reviews other recent regulatory and industry initiatives aimed at improving maintenance. Section 3 introduces Capability Maturity Models.

In Section 4, maintenance management is divided into its core processes and other complementary and supporting processes related to maintenance are specified. The responsibility for these processes varies across the industry depending on the business model, and the effect of this on the application of the work is considered. Section 5 presents the Capability Maturity Model for Maintenance Management (C4M), and describes its development, trials and available formats and gives some guidance on how companies can apply it themselves. The details of the model are contained in the Appendices.

The report concludes with a summary of the model, and recommends the sharing of experience. The Sponsors' Group and other contributors are acknowledged.

A number of words have specific meaning with regard to the CMM model and these are explained in the Glossary in Appendix 1.