

CHAPTER 49

RELIABILITY & MAINTAINABILITY (R&M) PLANS & PROGRAMMES

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1. INTRODUCTION

R&M Plans and Programmes are an important element of managing the achievement and delivery of R&M performance. This chapter discusses the similarities and differences between R&M plans and programmes with those of project and other management plans and programmes, and why a programme and plan is often needed. The provision and needs of R&M procedures within an organisation are also discussed.

2. BACKGROUND

A Plan is a detailed proposal for doing or achieving something, it should identify the timings (i.e. start, end date and possible interim dates), along with the required resources. Correctly conceived achievable plans coupled with prudent management will stand a high probability of delivering the intended deliverable to time, cost and quality, whereas, poorly implemented plans and/or management will most likely derive outcomes that are costly, late and of poor quality.

A Programme is a series of future events and is envisaged to deliver a change in an end state. A programme may not be constrained in terms of dates as for a plan, and may even be tailored to deliver long term change, i.e. such as organisational change. Specifically, programme management is the process of managing related projects with the purpose of improving an organisations performance, all within a systems engineering approach. A programme manager will have oversight of the projects that go to make up the programme and will provide influence that cannot be achieved at project management level, as the outcomes of individual projects will impact upon the outcome of the programme. Programme management will, therefore, encompass the management of dependencies and requirements between projects in pursuit of delivering a satisfactory end state.

3. THE IMPORTANCE OF R&M PLANS AND PROGRAMMES

The combined aims of the R&M Plan & Programme is to deliver a reliable product by identifying the mitigation of risks, delivering and demonstration of compliance and provision of progressive assurance. Additionally it provides a cohesive input to the TLMP, ITEAP, Business Case, ITT & R&M Case.

The R&M Plan consist of; Executive summary, Objectives of the R&M Plan, Analysis of R&M Stakeholders (including responsibilities), Summary of the R&M Strategy, Breakdown of R&M Plans Processes & Activities, Identification of Resource Requirements and Evaluation of Success Criteria.

In addition to the R&M Plan, the R&M Programme applies a systems engineering approach (i.e. pursuit of progressive assurance), to ensure that the delivered equipment(s) have been designed, manufactured and are supported in accordance with R&M methodologies.

Specifically, the MoD utilises Defence Standard 00-40 R&M Part 1 – Management Responsibilities and Requirements for Programmes and Plans, as part of contracting strategies to ensure that Systems, Equipment, Components and Services procured and maintained by the MoD are fit for purpose and meet the rigorous demands of the defence environment (refer to paragraph 5.1 for a more detailed breakdown).

4. SIMILARITIES AND DIFFERENCES BETWEEN R&M PLANS AND PROGRAMMES WITH THOSE OF PROJECT AND OTHER MANAGEMENT PLANS AND PROGRAMMES

	Similarities.	Differences.
R&M Plans & Programmes.	Structured methodology of risk mitigation, and project management.	Specifically tailored to derive continual improvement and support through life, whilst meeting the needs of R&M requirements. Comprehensive reasoning for the business case & the allocation of funds. Key requirement within the contracting strategy.
Project Management.	Structured methodology of planning, organising, allocating, managing, leading and controlling resources.	Primary aim is to deliver a specific deliverable within a set timescale.
Other types of Management Plans and Programmes.	Implementation of common practises, standardisation of language (i.e. for documentation), implementation of common project management methodologies, provision of common supporting techniques & tools and the improved chances of project success.	Concerned with the needs of other specific deliverables and outcomes.

5. THE MANAGEMENT OF R&M PROGRAMMES

R&M Programmes should be managed and tailored according to the type of procurement; the following standards give guidance on the application of R&M Programmes.

5.1 Ministry of Defence (MoD), Defence Standard 00-40 Part 1, Management

Responsibilities and Requirements for Programmes and Plans. This standard provides requirements for MoD practices, procedures and requirements during the design process, focussing activities on providing progressive R&M assurance. The first part of the Standard describes the responsibilities of the equipment Sponsor (who specifies the R&M requirements), the Project Manager of the Purchaser (Procuring Authority) and the Supplier (Contractor) towards the R&M specification, the R&M metrics, the acquisition and the supply of materiel that will satisfy the R&M requirements. The second part of the Standard sets out general requirements for R&M programmes and is intended to be used throughout the acquisition chain from prime contractor down to individual sub-contractors.

5.2 ¹IEC 60300-1 Dependability Management – Part 1: Dependability Management Systems.

This standard gives guidelines in establishing a dependability management system, and with tailoring the standard can be used to form part of a contract.

Reliability reflects user confidence in fitness for use by attaining satisfaction in product performance capability, delivering service availability upon demand, and minimising the costs associated with the acquisition and ownership throughout the life cycle.

The reliability management function should include:

- Strategic planning for reliability.
- Definition of a suitable organisational structure, including definition of responsibilities and authorities for reliability activities.
- Allocation of reliability resources.
- Communication of reliability objectives and the benefits arising out of the reliability activities.
- Identification of responsibilities and authorities for reliability management and activities.
- Establishment of reliability policy, programmes and associated processes.
- Implementation and control of reliability activities.
- Assessment of reliability performance results.
- Continual improvements of product reliability.
- Systematic reviews.

The process steps for managing reliability are:

- Define reliability objectives.
- Analyse scope of reliability work needed and implications.
- Plan strategy and activities to achieve reliability objectives.
- Implement selected reliability activities.
- Analyse results of reliability activities implemented.
- Evaluate achieved reliability results for further improvement.

¹International Standards use the term Dependability. Where this document references International Standards, Dependability should be read as meaning Reliability & Maintainability. Please refer to GR77 Part A Chapter 3 for further explanation.

5.3 BS5760-0 Reliability of constructed or manufactured products, systems, equipments and components – Part 0: Introductory guide to reliability. This standard gives a general overview of reliability, including:

Management of reliability;

- At organisational level (reporting structure).
- Promotion of reliability (including motivation of staff).
- Continual improvement techniques.
- Performance data reporting from the user to the producer.
- Requirement for a quality manual (for the producer), including;
 - Documentation for procedures, standards and personal responsibilities for reliability and quality.
 - Demonstration to employees and customers that there is management buy-in.

As part of the general overview, the standard gives an emphasis that quality is an investment not an expense, and that reliability as part of quality should start as early as the design feasibility study and be applied through life. Furthermore, getting the design correct at the design stage leads to lower whole life costs, whilst reliability leads to customer satisfaction and increased sales (and profit).

6. THE REQUIREMENT FOR SEPARATE PLANS IN ADDITION TO R&M PLANS

R&M Plans & Programmes as detailed in section 4 are far more comprehensive than individual Project Management Plans and other types of Management Plans and Programmes, specifically as they are tailored to derive continual improvement and support through life, whilst meeting the needs of R&M requirements. Furthermore, they give comprehensive reasoning for the business case (along with the allocation of funds), and are a key input into the contracting strategy.

Separate plans in addition to the main R&M Plans may, however, be required for specific aspects of the overall R&M Programme, such as a reliability growth programme. The need for separate plans would, therefore, need to be considered on an individual basis.

7. THE PROVISION AND NEEDS OF R&M PROCEDURES WITHIN AN ORGANISATION

The importance of R&M Procedures within an organisation is paramount, as they will ensure the consideration of R&M is undertaken, as opposed to on a casual basis which may well lead to increased through life costs as R&M may not have been given adequate consideration. Procedures also give a definitive corporately backed method of ways of working.

In turn R&M Procedures will give rise to the R&M Strategy, which will derive the following for equipment requirements; Evaluation of Data Available, Definition of Failure Definitions and Assumptions, Incorporation of Principles of Defence Standards, Research of Previous/Similar Options, Identification of Unique Elements to De-Risk Each potential Option, Formulation of Strategies to Prove/Provide Assurance of Levels of R&M Achievement and Generation of Inputs to Business Case, TLMP & URD.

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REFERENCES

- 1 IEC 60300-1: Dependability Management – Part 1: Dependability Management Systems.
- 2 BS 5760-0: Reliability of constructed or manufactured products, systems, equipments and components - Part 0: Introductory guide to reliability.
- 3 MoD Reliability and Maintainability Process Map 308: Strategy and Develop 'Through-Life' R&M Plan.
- 4 MoD Defence Standard 00-40 Part 1: Reliability and Maintainability (R&M) – Management Responsibilities and Requirements for Programmes and Plans.