

AS 4009—1992
IEEE Std 1028—1988
Reconfirmed 2014

Australian Standard[®]

Software reviews and audits

This Australian Standard was prepared by Committee IT/15, Software Engineering. It was approved on behalf of the Council of Standards Australia on 27 January 1992 and published on 16 April 1992.

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Australian Standard[®]

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First published as AS 4009—1992.

PUBLISHED BY STANDARDS AUSTRALIA
(STANDARDS ASSOCIATION OF AUSTRALIA)
1 THE CRESCENT, HOMEBUSH, NSW 2140

ISBN 0 7262 7361 9

PREFACE

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<i>Reference to ANSI/IEEE Standard</i>	<i>Australian Standard</i>
729 IEEE Standard Glossary of Software Engineering Terminology	—
829 IEEE Standard for Software Test Documentation	4006 Software test documentation

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Australian Standard**Software reviews and audits**

1. Scope and References

1.1 Scope. The purpose of this standard is to provide definitions and uniform requirements for review and audit processes. It does not establish the need to conduct specific reviews or audits; that need is defined by local policy. Where specific reviews and audits are required, standard procedures for their execution must be defined.

This standard provides such definition for review and audit processes that are applicable to products and processes throughout the software life cycle. Each organization shall specify where and when this standard applies and any intended deviations from this standard.

1.2 References. This standard shall be used in conjunction with the following publications:

[1] ANSI/IEEE Std 729-1983, IEEE Standard Glossary of Software Engineering Terminology.

[2] ANSI/IEEE Std 829-1983, IEEE Standard for Software Test Documentation.

2. Definitions

audit. An independent evaluation of software products or processes to ascertain compliance to standards, guidelines, specifications, and procedures based on objective criteria that include documents that specify

- (1) The form or content of the products to be produced.
- (2) The process by which the products shall be produced.
- (3) How compliance to standards or guidelines shall be measured.

review. An evaluation of software element(s) or project status to ascertain discrepancies from planned results and to recommend improvement. This evaluation follows a formal process (for example, management review process, technical review process, software inspection process, or walkthrough process).

software element. A deliverable or in-process document produced or acquired during software development or maintenance. Specific examples include but are not limited to

- (1) Project planning documents (for example, software development plans, and software verification and validation plans).
- (2) Software requirements and design specifications.
- (3) Test effort documentation (ie, as described in ANSI/IEEE Std 829-1983 [2])¹.
- (4) Customer-deliverable documentation.
- (5) Program source code.
- (6) Representation of software solutions implemented in firmware.
- (7) Reports (for example, review, audit, project status) and data (for example, defect detection, test).

For other definitions, including verification and validation, see ANSI/IEEE Std 729-1983 [1].

¹ The numbers in brackets correspond to those of the references in 1.2.

3. Introduction

Reviews and audits can be used in support of objectives associated with software quality assurance, project management, and configuration management, or similar control functions, as shown in Table 1. Those quality objectives, valid throughout software development and maintenance, include the need for evaluation, verification, validation, and compliance confirmation. For the sake of completeness, Test is identified in Table 1 as the principal process of validation. Testing, however, is outside the scope of this standard. Processes defined in this standard include

- (1) Management review
- (2) Technical review
- (3) Software inspection
- (4) Walkthrough
- (5) Audit.

- I To support compliance confirmation, auditing activities may include performing reviews and tests to determine product consistency with respect to established baselines (ie, software requirements specifications or design descriptions) or to witness the correctness of implementation.

Moreover, since quality assurance deals with products and processes, Fig 1 provides a view of how various quality assurance processes can be

Table 1
Some Principal Processes for Achieving Quality Objectives

Objectives	Principal Processes Include
Evaluation	Management review, Technical review
Verification	Inspection, Walkthrough
Validation	Test
Compliance, Confirmation	Audit

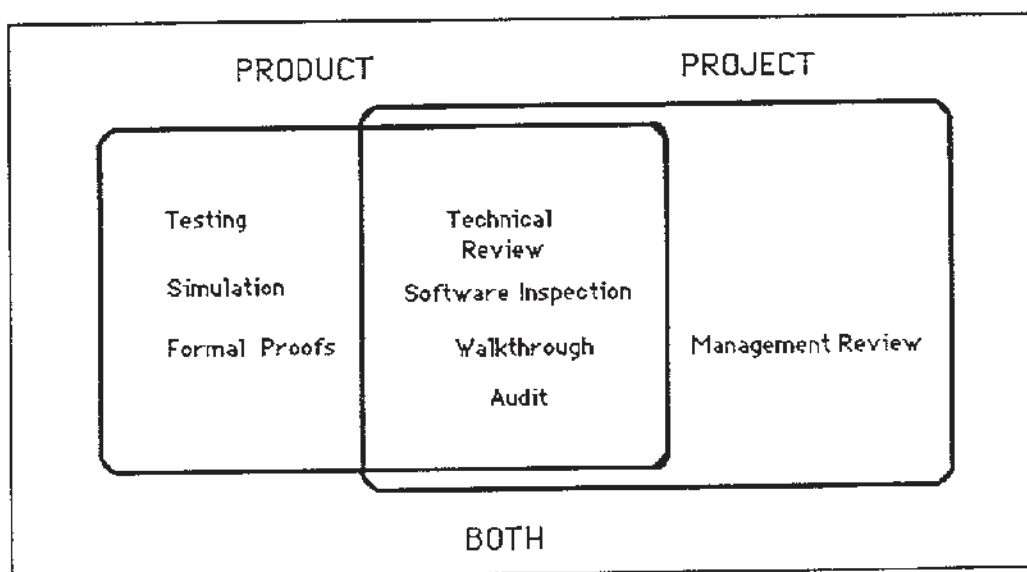
mapped to examine product and project issues.

The examination of project issues (both technical and managerial) occurs at various phases during the project life cycle. The results of such examinations are meant to permit improvement of the methods of ensuring software quality and the ability to meet time and cost constraints. The evaluation of software elements occurs during the production of the element(s) and on its completion. This ensures that the element(s) completely and correctly embodies its baseline specifications.

Any standard process has prerequisite conditions; those conditions necessary, though not in themselves sufficient for the process to reach completion. For reviews and audits, these conditions are identified in 3.1 and 3.2 respectively.

Fig 1

Relation of Some Quality Assurance Processes to Products and Projects



Section 3.3 presents the template used to define review and audit processes in the following sections.

3.1 Review Process Prerequisites. The objective of reviewing software elements is to evaluate software or project status to identify discrepancies from planned results and to recommend improvement where appropriate.

The following managerial offices are to achieve that objective:

3.1.1 Management

- (1) Responsible for reviews, and the anticipated product rework.
- (2) Responsible for performance of reviews and reporting of review results against project milestone events.
- (3) Provides the necessary resources of time, personnel, budget, and facilities required to plan, define, execute, and manage the reviews.

3.1.2 Development Staff

- (1) The staff has a level of development expertise and product knowledge sufficient to comprehend the software under review.
- (2) Training and orientation in the use of the review processes are provided to the staff.

3.1.3 Development Process Planning

- (1) Standard entry and exit criteria have been defined for development phases.
- (2) The product criteria (such as readability and modularity) are sufficiently defined by development standards.
- (3) The product is partitioned into manageable, reviewable units.
- (4) The software elements to be reviewed and the review process to be employed are identified in the project planning documents (for example, Software Quality Assurance Plan, Software Verification Plan, and Software Project Management Plan).

3.1.4 Review Process Planning

- (1) Each type of review to be employed is fully specified.
- (2) Administrative procedures are defined to enable the review to be initiated, executed, recorded, and acted on.
- (3) The responsibility is assigned for the planning, specification, administration, and maintenance of the review process.

3.2 Audit Process Prerequisites. The objective of software auditing is to provide an objective evaluation of products and processes to confirm compliance to standards, guidelines, specifications, and procedures. The following requirements are prerequisite to achieve that objective:

- (1) Objective audit criteria exist (for example, contracts, requirements, plans, specifications, standards) against which software elements and processes can be evaluated.
- (2) Audit personnel are selected to promote team objectivity. They are usually independent of any direct responsibility for the products and processes examined and may be from an external organization.
- (3) Audit personnel are given sufficient authority by appropriate management to perform the audit.

3.3 Procedural Description Template. The following descriptions establish the minimum template used to plan, prepare, and execute any review or audit. The review and audit process descriptions in this standard follow this common template:

- (0.1) *Objective:* Process goals.
- (0.2) *Abstract:* Process overview.
- (0.3) *Special Responsibilities:* Roles unique to this specific process.
- (0.4) *Input:* Products to which the process is applied, and supporting information.
- (0.5) *Entry Criteria:* Conditions that must be satisfied before the process can begin.
- (0.6) *Procedures:* Standard steps followed in performing the process.
- (0.7) *Exit Criteria:* Conditions that must be satisfied before this process is considered complete.
- (0.8) *Output:* The minimum set of deliverables resulting from process completion.
- (0.9) *Auditability:* Description of evidence needed to determine at a later date that the process was followed.

Additional template sections have been added to these basic nine sections when needed.

- Procedure descriptions in section “().6” will be presented as to include, but not be limited to, the following steps:

().6.1 Planning ().6.3 Preparation

().6.2 Overview ().6.4 Examination

Additional procedure subsections have been added where needed.

4. The Management Review Process

4.1 Objective. The objective of a management review is to provide recommendations for the following:

- (1) Making activities progress according to plan, based on an evaluation of product development status;
- (2) Changing project direction or to identify the need for alternative planning;
- (3) Maintaining global control of the project through adequate allocation of resources.

The management review process can be applied to new development or to maintenance activities.

4.2 Abstract. A management review is a formal evaluation of a project level plan or project status relative to that plan by a designated review team.

During the review meeting the entire review team examines plans or progress against applicable plans, standards, and guidelines, or both. Each problem area identified by the review team is recorded. When critical data and information cannot be supplied, then an additional meeting shall be scheduled to complete the management review process.

4.3 Special Responsibilities. The review leader is responsible for the administrative tasks pertaining to the review, for assuring that the review is conducted in an orderly manner, and for issuing the management review report (see 4.8). The individual(s) responsible for formally reporting the status of the project under review will ensure that the project status and all supporting documentation are available for distribution.

Each member of the review team is responsible for the following:

- (1) Being adequately prepared for the meeting;
- (2) Ensuring that the review meets its objectives.

4.4 Input. The minimum input to the management review process is as follows:

- (1) A statement of objectives for the management review;
- (2) A list of issues to be addressed;
- (3) Current project schedule and cost data;
- (4) Reports (for example, managerial review reports, technical review reports, audit reports) from other reviews or audits, or both, already completed;
- (5) Reports of resources assigned to the project;
- (6) Data on the software elements completed or in progress.

Additional applicable reference material can be supplied by project management or requested by the review leader.

4.5 Entry criteria

4.5.1 Authorization. The need for conducting certain management reviews is initially established in the appropriate project planning documents (for example, Software Quality Assurance Plan, Software Development Plan, or Software Verification and Validation Plan). Under these plans, completion of a specific software element (for example, a Planning Document, a Requirements Specification, a Design Document, and Code Specification), or completion of a phase can trigger a management review.

In addition to those management reviews required by a specific plan, other management reviews may be formally announced and held at the request of software quality management, functional management, project management or the customer, according to local procedures.

4.5.2 Initiating Event. A management review is conducted when a selected review leader does the following:

- (1) Establishes or confirms a statement of objectives for the meeting;
- (2) Judges that the software element(s) and any other documentation or reports pertinent to the review are sufficiently complete and their status available to support the review objectives.