Learning Materials

Planning, Control and Quality Systems

AIM OF THE MODULE
- to acquire knowledge about quality planning methods applied in organizations,
- quality management systems applied in production,
- and quality assurance methods applied in production.
- to develop practical skills in intermediate and final product control, applying control methods in technological process.

ASSESMENT FORM

Students will be able
- to apply acquired knowledge and skills in professional activities,
- carry out product quality assessment,
- present their decisions and ideas effectively,
- creatively use visual means of expression as well as the latest quality assurance methods

TARGET GROUP
Wide range of learners of various profiles and scales of woodworking and furniture manufacturing companies, as well as different levels of responsibility and competence - from employees directly involved in production technological processes to a medium-sized woodworking plant manager.

WORK-BASED-LEARNING
The implementation of the project is based on the allocation of fields of responsibility based on the area in which their company works, or personal interest. Work based learning is folowing all the models from the beginning to the end of the studies.
All the topics have been chosen to be relevant to the working environment in a wood processing or furniture company, and all the discussions and case studies have been related to a real work environment, including practical, drafting, layout, planning work. This is also reflected in the Methods and ideas for learning process and Assessment of acquired learning outcomes (optimal level).

Innovation is highlighted in the themes (See the Model description):
1.1.6. Methods of wood materials selective control.
1.1.7. Methods of steel materials selective control.
1.1.8. Methods of other materials selective control.
1.1.9. Energy classes of production buildings.
1.1.10. Performing energy audits of production buildings.
1.1.11. Automated control machines.
1.2.1. Features of continuous control

READING LIST

Year of publication	Author and title of the publication	Publishing house
2012	A.Čereška "Kokybės valdymas ir optimizavimas" **"Quality management and optimisation"**	VGTU"Technika"
2007	A.Kaziliūnas "Kokybės valdymas" **"Quality management"**	M.Romerio universitetas
2012	B.Jančiauskas "Pramonės įmonių valdymas" **"Industrial enterprise management"**	VGTU"Technika"
2008	P.Vanagas "Visuotinės kokybės vadyba" **"Total Quality Management"**	Technologija
2020	L.Šimanskienė "Organizacinė kultūra: vertinimas, formavimas, keitimas" **"Organisational culture: assessing, shaping, changing"**	Klaipėdos Universitetas
2003	H.Medekšas "Gaminių kokybė ir patikimumas" **"Product quality and reliability"**	Technologija
2020	R.Tricker "Quality Management Systems"	
2005	V.Nande "Quality Management System.Handbook for Product Development Companies"	

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Topic:

"Guidance for audits of quality and/or environmental management systems (ISO 19011:2002)"

Author
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Guidance for audits of quality and/or environmental management systems (ISO 19011:2002)

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Foreword to the International Standard

The International Standards Organization (ISO) is a worldwide federation of national standards organizations (ISO members). International standards are usually prepared by ISO technical committees. Each ISO member with an interest in a particular field of activity (if a technical committee is established for that field) is entitled to have representatives on that committee. International governmental and non-governmental organizations that have relations with ISO also participate in this work. In all areas related to electrotechnical standardization, ISO works closely with the International Electrotechnical Commission (IEC).

International standards are developed in accordance with the rules contained in Part 3 of the ISO/IEC Directives. Draft International Standards prepared by the Technical Committees are sent to ISO members for approval by vote. An International Standard is issued if at least 75% of the members voting on the document have approved it.

It is noted that some elements of this International Standard may be subject to patenting. ISO cannot be responsible for identifying some or all patentable subject matter.

ISO 19011 has been prepared by Subcommittee SC 3 Supporting technologies of ISO/TC 176 Quality management and quality assurance and Subcommittee SC 2 Environmental auditing and related environmental investigations of ISO/TC 207 Environmental management of ISO/TC 207 Technical Committee of the International Organization for Standardization.

The first edition of ISO 19011 supersedes and replaces ISO 10011-1:1990, ISO 10011-2:1991, ISO 10011-3:1991, ISO 14010:1996, ISO 14011:1996 and ISO 14012:1996.

Introduction to the international standard

ISO 9000 and ISO 14000 series of international standards emphasize the importance of audits as a management tool to monitor and verify the effective implementation of an organization's quality and/or environmental policy. Audits are also an important part of compliance activities such as external certification/registration and supply chain assessment and surveillance.

This International Standard provides guidance on the conduct of internal or external audits of audit programme management, quality and/or environmental management systems and on the competence and assessment of auditors. It is applicable to a wide range of potential users, including auditors, organizations implementing quality and/or environmental management systems, organizations that need to carry out contract audits of their quality and/or environmental management systems, and organizations that certify or train auditors, certify or register management systems, and accreditation or standardization of conformity assessment.

The guidance given in this International Standard should be flexible. As indicated at various points in the text, the application of this guidance may vary depending on the size, type and complexity of the organization to be audited and the objectives and scope of the audits to be carried out. This International Standard provides additional guidance or examples on specific issues in boxes. In some cases, this has been done to assist small organizations in applying this International Standard.

Chapter 4 describes the audit principles. These principles help the user to appreciate the essential nature of an audit and are a necessary introduction to Chapters 5, 6 and 7.

Chapter 5 provides guidance on the management of audit programmes and addresses issues such as allocating responsibility for managing audit programmes, setting audit programme objectives, coordinating audit activities and adequately resourcing the audit team.

Chapter 6 provides guidance on the auditing of quality and/or environmental management systems and the selection of audit teams.

Chapter 7 provides guidance on the necessary auditor competences and describes the process for assessing auditors.

Where quality and environmental management systems are implemented together, it is at the discretion of the user of this International Standard whether the audits of the quality management system and the environmental management system will be carried out together or separately.

Although this International Standard is applicable to audits of quality and/or environmental management systems, the user may adapt or extend the guidance given here if it wishes to apply it to other types of audits, including audits of other management systems.

This International Standard provides guidance only, but users can use it to set their own audit requirements.

In addition, any other person or organization interested in monitoring compliance with requirements defined in, for example, product specifications or laws and regulations may find the guidance in this International Standard useful.

1. Scope

This International Standard provides guidance on the principles of auditing, audit programme management, the conduct of quality management system audits and environmental management system audits, and on the competence of quality and environmental management system auditors. This International Standard applies to all organizations that need to carry out internal or external audits of quality and/or environmental management systems or manage an audit programme. This International Standard can in principle be applied to other types of audits, provided that particular attention is paid to determining the competence required of the members of the audit team in each such case.

2. Regulatory references

The following standards contain statements that are referenced in this International Standard. Subsequent revisions or revisions to the references given are not applicable to this edition. However, it is recommended that parties whose contracts are based on this International Standard find it possible to apply the latest editions of the following standards. Subsequent editions of the normative documents referenced by undated references are applicable. ISO and IEC members use the registers of standards currently in force. ISO 9000:2000 Quality management systems - Fundamentals and vocabulary"; ISO 14050:2002 Environmental management - Vocabulary.

3. Terms and definitions

The terms and definitions used in this International Standard are those given in ISO 9000 and ISO 14050, except where superseded by the following terms and definitions.
A term in a definition or note that is defined elsewhere in this chapter is shown in bold type and indicated by a sequential number in brackets. In a definition, such a bolded term may be replaced by its full definition.

3.1 **Audit** - a systematic, independent and documented process for gathering and objectively evaluating **audit evidence** (3.3) to determine the degree of compliance with **audit criteria** (3.2)

1. NOTE: Internal audits, sometimes referred to as first-party audits, are conducted by or on behalf of an organization for evaluative management analysis and other internal purposes and may form the basis for declaring an organization's compliance. In many cases, particularly in smaller organizations, independence may be demonstrated by the absence of responsibility for the audited activity.

2. NOTE: External audits are also known as "second" or "third party audits". Second-party audits are carried out by parties with an interest in the organization, e.g. users or other persons acting on their behalf. Third-party audits are carried out by external independent organizations.   Such organizations issue certificates or register compliance with the requirements of ISO 9001*" and ISO 14001".

3. NOTE: When quality and environmental management systems are audited jointly, this is referred to as a "joint audit".

4. NOTE: When two or more audit organizations cooperate to audit a single auditee (3.7), this is referred to as a "single audit".

3.2 **Audit criterion** - a set of policy procedures or requirements.
NOTE: The audit criteria are used as a reference against which audit evidence (3.3) can be qualified.

3.3 **Audit evidence** - records, statements of fact or other information that relate to the audit criteria (3.2) and can be verified.
NOTE: Audit evidence may be qualitative or quantitative.

3.4 **Audit data** - the results of comparing the collected audit evidence (3.3) with the audit criteria (3.2).
NOTE: Audit data may indicate compliance or non-compliance with the audit criteria, or opportunities for improvement.

3.5 Audit conclusion - the audit decision (3.1) made by the audit team (3.9) after consideration of all the audit objectives and all the audit data (3.4)

3.6 Audit client - the organization or person requesting the audit.

NOTE: The audit client may be the auditee (3.7) or any organization that has a legal or contractual right to request an audit.

3 .7 Auditee - the organization being audited.

3.8 Auditor - a person whose competence (3.14) enables the audit to be carried out.

3.9 Audit team - one or more auditors (3.8) carrying out the audit, assisted by technical experts (3.10) if necessary.

1 NOTE: One of the auditors in an audit team is normally appointed as the audit team leader.

2 NOTE: The audit team may include auditors in training.

3.10 **Technical Expert** - a person who provides specific knowledge or expertise to the audit team (3.9).

NOTE 1: Specific knowledge or expertise is knowledge or expertise about the audited organization, its operations, processes, language or culture.
NOTE 2: A technical expert does not perform the functions of an auditor (3.8) in an audit team.

3.11 **Audit programme** is a set of one or more audits (3.1) planned for a specific period of time and with a specific purpose.
NOTE: An audit programme includes all activities necessary to plan, organize and perform an audit.

3.12 **Audit plan** - a description of the activities and preparations for an audit (3.1).

3.13 **Audit scope** - the scope and limits of an audit (3.1).
NOTE: The scope of an audit normally includes a description of physical locations, organizational units, activities and processes, and the time period.

3.14 Competence - Demonstrated personal qualities and demonstrated ability to apply knowledge and skills.

4. Principles of auditing

Audit is characterized by its dependence on a number of principles. They make auditing an effective and reliable tool to support management policies and governance, providing information on what an organization needs to do to improve its performance. Strict adherence to these principles is a prerequisite for the provision of audit findings that are relevant and sufficient to enable auditors to act independently of each other to reach similar conclusions in similar circumstances.
The following principles are relevant to auditors.

a) Ethical performance: the foundation of professionalism.
Trust, integrity, confidentiality and discretion are essential in the conduct of an audit.

 b) Fair presentation: the obligation to present true and accurate accounts.
Audit findings, conclusions and reports shall fairly and accurately reflect the audit activity. Significant obstacles encountered during the audit and unresolved disagreements between the audit team and the auditee shall be reported.

c) Due professional care: diligence and fairness in the conduct of the audit.

Auditors need to be sensitive to the importance of the engagement and the trust and confidence placed in them by the clients or other stakeholders. An important factor is to have the necessary expertise. The other principles relate to an audit that is essentially independent and systematic.

d) Independence: the basis for the impartiality of the audit and the objectivity of the audit findings.
Auditors are independent of the audited activity and are impartial and free from conflicts of interest. Auditors shall remain objective during the audit to ensure that audit findings and conclusions are based solely on audit evidence.

e) Evidence-based approach: a rational approach to achieving reliable and reproducible audit conclusions in a systematic audit process. It is based on a sample of available information because the audit is carried out within a limited time frame and with finite resources. The appropriate use of sampling is closely linked to confidence in the audit findings. The guidance in other sections of this International Standard is based on the principles set out above.
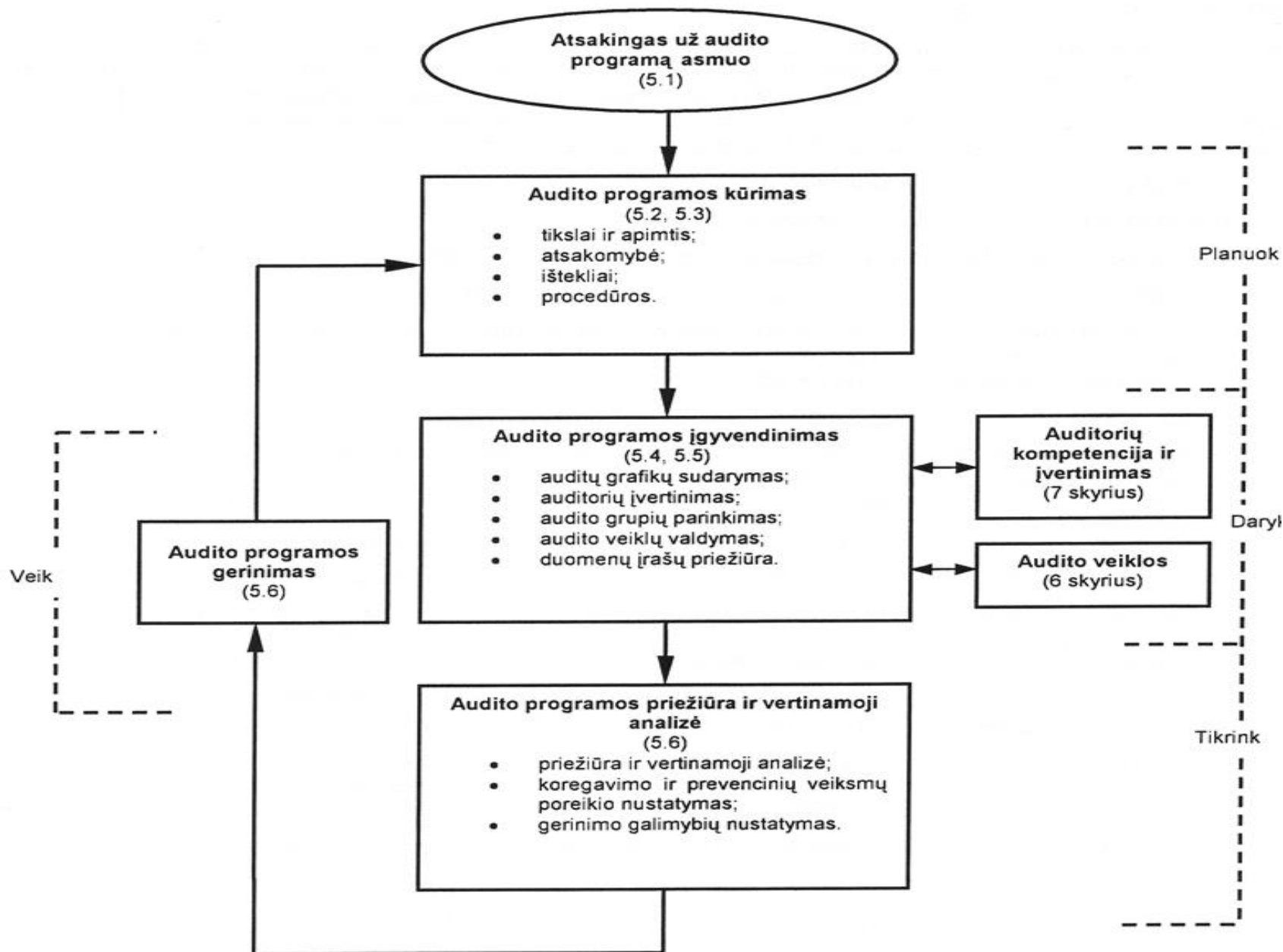
5 Managing the audit programme

5.1 General

The audit programme may include one or more audits, depending on the size, nature and complexity of the audited organization. These audits may have multiple objectives and may include joint or single audits (see notes 3 and 4 to audit definition (3.1)).

The audit programme also includes all the activities necessary to plan and organize the types and number of audits and to provide the resources needed to carry out the audits efficiently and effectively within the timeframe specified.

An organization may establish more than one audit programme.

The organization's top management should provide the authority to manage the audit programme.

Those responsible for managing the audit programme should: design, implement, monitor, evaluate, analyze and improve the audit programme, and identify and ensure that the necessary resources are available. Figure 1 provides a flowchart of the audit programme management process.

Atsakingas už audito programą asmuo
(5.1)

Audito programos kūrimas
(5.2, 5.3)
- tikslai ir apimtis;
- atsakomybė;
- ištekliai;
- procedūros.

Planuok

Audito programos įgyvendinimas
(5.4, 5.5)
- auditų grafikų sudarymas;
- auditorių įvertinimas;
- audito grupių parinkimas;
- audito veiklų valdymas;
- duomenų įrašų priežiūra.

Auditorių kompetencija ir įvertinimas
(7 skyrius)

Audito veiklos
(6 skyrius)

Daryk

Audito programos gerinimas
(5.6)

Veik

Audito programos priežiūra ir vertinamoji analizė
(5.6)
- priežiūra ir vertinamoji analizė;
- koregavimo ir prevencinių veiksmų poreikio nustatymas;
- gerinimo galimybių nustatymas.

Tikrink

1 paveikslas. Audito programos vadybos proceso srauto pavyzdys

NOTE 1: Figure 1 also shows the application of the Plan-Do-Check-Act methodology in this international standard.

NOTE 2: The numbers in this and all other figures correspond to the chapter numbers of this standard.

If the organization to be audited operates both quality management and environmental management systems, the programme may include joint audits. In this case, particular attention should be paid to the competence of the audit team.

Two or more auditing organizations may cooperate to carry out joint audits as part of their audit programmes. In this case, particular attention should be paid to the division of responsibilities, the provision of any additional resources, the competence of the audit team and the relevant procedures. All of these matters should be agreed before the audit commences.

Practical help. Examples of audit programmes

Examples of audit programmes include:

a) several internal audits covering the organisation's quality management system for the year;

b) second-party management system audits with potential suppliers of crisis products within 6 months;

c) environmental management system certification or registration and surveillance audits shall be carried out by a third party certification or registration organization within the timeframe specified in the contract between the certification organization and the client.

The audit programme shall also include adequate planning, resourcing and procedures to enable audits to be carried out in accordance with the programme.

5.2 Objectives and scope of the audit programme

5.2.1 Objectives of the Audit Programme

The objectives of the audit programme should be defined to guide the planning and conduct of audits.

These objectives may be justified:

a)   Management priorities;

b)   commercial intent;

c)   management system requirements;

d)   requirements of legal regulations and contracts;

e)   the need for supplier evaluation;

f)   customer requirements;

g)   the needs of other interested parties;

h)   And the organization's risks.

Practical help. Examples of audit programme objectives

Examples of audit programme objectives:

a)   To achieve compliance with the requirements of the management system standard through certification;

b)   to verify compliance with contract requirements;

c)   to gain and maintain confidence in the supplier's capability;

d)   contribute to the improvement of the management system.

5.2.2 Scope of the audit programme

The scope of the audit programme may vary. It may be influenced by the size, nature and complexity of the organization being audited, as well as:

a)   the scope, purpose and duration of each audit to be performed;

b)   the frequency of the audits to be carried out;

c)   the number, importance, complexity, similarity and location of the activities to be audited;

d)   the requirements of standards, laws, regulations and contracts and other audit criteria;

e)   the need for accreditation and registration or certification;

f)   the findings of previous audits or the results of an evaluative analysis of a previous audit programme;

g)   any linguistic, cultural or social issues;

h)   stakeholder interests;

i)   significant changes in the organization or its activities.

5.3 Responsibility for the audit programme, audit programme resources and procedures

5.3.1 Responsibility for the audit programme

Responsibility for the management of the audit programme should be assigned to one or more persons who have a common understanding of audit principles, the competence of the auditors and the application of audit methodology. They should have management skills and a technical and business understanding of the relevant audited activities.

Those responsible for managing the audit programme should:

a)   define the objectives and scope of the audit programme;

b)   define responsibilities and establish procedures and ensure resourcing;

c)   ensure the implementation of the audit programme;

d)   ensure that appropriate records of the audit programme are maintained;

e)   andmonitor, review and improve the audit programme.

5.3.2 Audit programme resources

In determining the resources required for the audit programme, consideration should be given to:

a)   the financial resources required to develop, implement, manage and improve the audit activity;

b)   the audit methodology;

c)   the processes required to achieve and maintain auditor competence and improve auditor performance;

d)   the availability of auditors and technical experts with the appropriate expertise to meet the specific objectives of the audit programme;

e)   the scope of the audit programme;

f)   and travel time, accommodation and other audit needs.

5.3.3 Audito programos procedūros

Audito programos procedūros turėtų apimti:

a)   auditų planavimą ir jų grafikų sudarymą;

b)   auditorių ir audito grupės vadovų kompetencijos užtikrinimą;

c)   tinkamą audito grupių parinkimą ir jų pareigų bei atsakomybės paskyrimą;

d)   audito atlikimą;

e)   jei taikoma, priežiūros auditų atlikimą;

f)   audito programos įrašų priežiūrą

g)   audito programos veiklos stebėseną (monitoringą) ir rezultatyvumą;

h)   atsiskaitymą aukščiausiajai vadovybei apie bendrus audito programos laimėjimus. Mažesnėse organizacijose visos anksčiau paminėtos veiklos gali būti įtrauktos į vieną procedūrą.

5.4 Implementation of the audit programme

The implementation of the audit programme should include:

a) the submission of the audit programme to the relevant parties;

b) coordination and scheduling of audits and other activities related to the audit programme;

c) establishing and maintaining a process for the evaluation and continuing professional development of auditors in accordance with 7.6 and 7.5;

d) ensuring the selection of audit teams;

e) providing audit teams with the necessary resources;

f) ensuring that audits are carried out in accordance with the audit programme;

g) ensuring the management of records of audit activities;

h) ensuring the evaluative analysis and validation of audit reports and the provision of reports to the audit client and other specified parties;

i) ensuring follow-up audits as necessary.

5.5 Audit programme records

Records should be maintained to show the implementation of the audit programme and should include:

(a) records relating to individual audits, e.g:

- audit plans;

- audit reports;

(b) reports of non-conformities;

- corrective and preventive action reports;

- and follow-up audit reports, as appropriate.

- the results of the analysis of the evaluative audit programme;

(c) records relating to audit staff:

- an assessment of the auditor's competence and performance;

- the selection of the audit team;

- monitoring and improvement of competence.

Records should be maintained and appropriately stored.

5.6 Monitoring and evaluative analysis of the audit programme

The implementation of the audit programme should be monitored and analysed at appropriate intervals to assess whether its objectives have been achieved and to identify opportunities for improvement. The results should be reported to senior management.

Performance indicators should be used to monitor these characteristics:

- the audit team's ability to implement the audit plan;
- compliance with audit programmes and schedules; and
- feedback from audit clients, auditees and auditors.

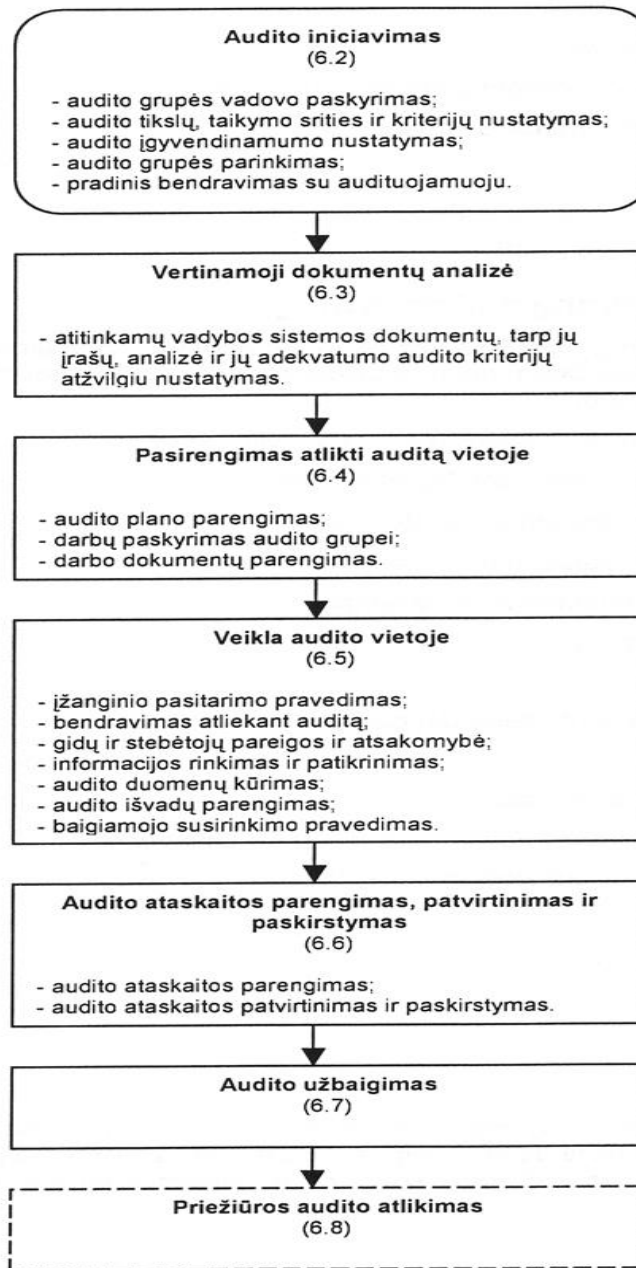The evaluative analysis of the audit programme should examine, for example:

a) the results and direction of monitoring;
b) compliance with procedures;
c) emerging stakeholder needs and expectations;
d) records of audit programmes;
e) alternative or new audit approaches;

And the consistency of audit teams in similar circumstances. The results of the evaluative analysis of the audit programme may be followed by corrective and preventive actions and improvements to the audit programme.

6 Audit activities

6.1 General

This chapter provides guidance on the planning and implementation of audit activities as part of the audit programme. Figure 2 provides an overview of typical audit activities. The extent to which the provisions of this chapter are applied depends on the scope and complexity of the particular audit and the intended use of the audit findings.

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┌─────────────────────────────────────────┐
│          Audito iniciavimas              │
│               (6.2)                      │
│                                          │
│  - audito grupės vadovo paskyrimas;      │
│  - audito tikslų, taikymo srities ir     │
│    kriterijų nustatymas;                 │
│  - audito įgyvendinamumo nustatymas;     │
│  - audito grupės parinkimas;             │
│  - pradinis bendravimas su auditojamuoju.│
└─────────────────────────────────────────┘
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┌─────────────────────────────────────────┐
│     Vertinamoji dokumentų analizė        │
│               (6.3)                       │
│                                          │
│  - atitinkamų vadybos sistemos dokumentų,│
│    tarp jų įrašų, analizė ir jų          │
│    adekvatumo audito kriterijų           │
│    atžvilgiu nustatymas.                 │
└─────────────────────────────────────────┘
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┌─────────────────────────────────────────┐
│    Pasirengimas atlikti auditą vietoje   │
│               (6.4)                       │
│                                          │
│  - audito plano parengimas;              │
│  - darbų paskyrimas audito grupei;       │
│  - darbo dokumentų parengimas.           │
└─────────────────────────────────────────┘
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                     ▼
┌─────────────────────────────────────────┐
│          Veikla audito vietoje           │
│               (6.5)                       │
│                                          │
│  - įžanginio pasitarimo pravedimas;      │
│  - bendravimas atliekant auditą;         │
│  - gidų ir stebėtojų pareigos ir         │
│    atsakomybė;                           │
│  - informacijos rinkimas ir patikrinimas;│
│  - audito duomenų kūrimas;               │
│  - audito išvadų parengimas;             │
│  - baigiamojo susirinkimo pravedimas.    │
└─────────────────────────────────────────┘
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                     ▼
┌─────────────────────────────────────────┐
│  Audito ataskaitos parengimas,           │
│    patvirtinimas ir paskirstymas         │
│               (6.6)                       │
│                                          │
│  - audito ataskaitos parengimas;         │
│  - audito ataskaitos patvirtinimas ir    │
│    paskirstymas.                         │
└─────────────────────────────────────────┘
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┌─────────────────────────────────────────┐
│          Audito užbaigimas               │
│               (6.7)                       │
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┌ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┐
│       Priežiūros audito atlikimas        │
│               (6.8)                       │
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PASTABA   Brūkšninė linija rodo, kad jokie priežiūros audito veiksmai paprastai nelaikomi audito dalimi.

2 paveikslas. Tipinių audito veiklų apžvalga

6.2 Initiating an audit

6.2.1 Appointment of the Audit Team Leader

Those responsible for the management of the audit programme should appoint an audit team leader for a specific audit.

In the case of single audits, it is important for the auditing organizations to agree on the specific responsibilities of each organization, in particular the authority of the team leader appointed for the audit, before the audit is launched.

6.2.2 Defining the objectives, scope and criteria of the audit

Within the overall objectives of the audit programme, individual audits should be based on documented objectives, scope and criteria.

The audit objectives define what is to be performed during the audit and may include:

a) Determining the degree of agreement of the auditee's management system, or part of it, with the audit criteria;

b) assessing the ability of the management system to ensure compliance with the requirements of laws, regulations and contracts;

c) an assessment of the effectiveness of the management system in meeting its objectives;

d) identification of potential areas for improvement of the management system.

The scope of the audit describes the scope and boundaries of the audit, such as the physical location of the organizational units, activities and processes to be audited, as well as the timing of the audit.

Audit criteria are used as a reference against which compliance is determined and may include applicable policies, procedures, standards, laws and regulations, management system requirements, contractual requirements or industry/business sector codes.

The audit objectives should be set by the audit client. The audit scope and criteria should be determined by the audit client and the audit team leader in accordance with the audit programme procedures. Any changes to the audit objectives, scope or criteria should be agreed by the same parties.

When a joint audit is performed, it is important that the audit team leader ensures that the audit objectives, scope and criteria are consistent with the nature of the joint audit.

6.2.3 Determining the feasibility of an audit

The feasibility of an audit should be determined by taking into account factors such as the existence of:

- Adequate and appropriate information to plan the audit;
- adequate cooperation from the auditee; and
- adequate time and resources.

Where the audit cannot be carried out, an alternative should be offered to the audit client in consultation with the auditee.

6.2.4 Selection of the audit team

Once it has been confirmed that the audit is feasible, the audit team should be selected, taking into account the expertise that is necessary to achieve the audit objectives. If there is only one auditor, he or she should perform all the duties of the audit team leader. Chapter 7 provides guidance on how to determine the required competencies and describes the processes for assessing the auditors.

The size and composition of the audit team should take into account:

a)   the objectives, scope, criteria and planned duration of the audit;

b)   whether the audit is joint or combined;

c)   the overall competence of the audit team necessary to achieve the audit objectives;

d)   applicable legal, regulatory, contractual and accreditation or certification requirements;the need to ensure the independence of the audit team from the audited activity and to avoid conflicts of interest;

e)   the ability of the members of the audit team to communicate effectively with the auditee and to work together;

f)   the language of the audit and knowledge of the particular socio-cultural characteristics of the auditee; what can be taken into account is determined either by the auditor's own skills or by an invited technical expert.

The process to ensure the overall competence of the audit team should include: -
- Identification of the knowledge and skills necessary to achieve the audit objectives;

-    selecting audit team members such that the audit team contains all the necessary knowledge and skills.

If the auditors on the audit team do not have all the necessary skills and knowledge, technical experts may be called upon. Technical experts should act under the direction of the auditor.

Trainee auditors may be included in the audit team but should not act without guidance or direction.

Both the audit client and the auditee may request changes to specific members of the audit team for good cause, based on the audit principles described in Chapter 4. Examples of reasonable grounds include: conflicts of interest (e.g. a member of the audit team was previously an employee of the auditee or provided consultancy services to the auditee) and previous unethical behavior. Such reasons should be brought to the attention of the audit team leader and those responsible for the management of the audit programme, who should resolve the matter with the audit client and the auditee before any decision is taken to change the audit team members.

6.2.5 Initial communication with the auditee

The initial communication with the auditee may be informal or formal but should be made by those responsible for the management of the audit programme or the audit team leader. The purpose of the initial communication is:

a) Establish channels of information exchange with the auditee's representative;
b) confirm the authority to carry out the audit provide information on the proposed timing and composition of the audit team;
c) request access to relevant documents, including records;
d) establish the applicable local security rules;
e) prepare for the audit;
f) and agree on the presence of observers and the need for audit team guides.

6.3 Evaluative document analysis

Prior to an on-the-spot audit, an evaluative analysis of the auditee's documentation should be carried out to determine whether the documented system meets the audit criteria. The documentation may include relevant management system documents and records and previous audit reports. The evaluative analysis should take into account the size, nature and complexity of the organization and the objectives and scope of the audit. In some situations, this analysis may be delayed until the start of the fieldwork, provided that this is not detrimental to the effectiveness of the audit. In other cases, a preliminary visit to the audit site may be made to get a proper picture of the information available.

If documentation is found to be inadequate, the audit team leader should inform the audit client, those responsible for managing the audit programme and the auditee. A decision should be made as to whether the audit should continue or be terminated until the relevant documentation is in order.

6.4 Preparation for the on-the-spot audit

6.4.1 Preparation of the audit plan

The audit team leader should prepare an audit plan to support the agreement between the audit client, the audit team and the auditee to conduct the audit. The plan should facilitate scheduling and coordination of audit activities.

The audit plan should detail the scope and complexity of the audit. Details may vary, for example, between initial and follow-up audits and between internal and external audits. The audit plan should be sufficiently flexible to allow for changes, e.g. changes in the scope of the audit, which becomes necessary as the activities on the audit site expand.

The audit plan should include:

a)   audit objectives;

b)   the audit criteria and any reference documents;

c)   the scope of the audit and the identification of the organizational and functional units and processes to be audited;

d) the dates and locations where the on-site audit is to be carried out;

e) the estimated timing and duration of on-site audit activities, including meetings with the auditee's management and audit team meetings;

f) the roles and responsibilities of audit team members and accompanying persons;
g) the allocation of appropriate resources to crisis audit areas.

The audit plan should also include, as appropriate:

h) the identification of the auditee's representative for the audit;

i)   the language of the audit work and reporting, where this is different from the language of the auditor and/or the auditee;

j) the topics of audit reports;

k) logistical arrangements (travel, facilities at the audit site, etc.);

l) matters relating to confidentiality;

m) any follow-up to the audit.

The audit client should analyze the plan and accept it. The plan should be made available to the auditee prior to the commencement of the on-site audit activity.

Any objections by the auditee should be resolved by the audit team leader, the auditee and the audit client. Any revised plan should be agreed by the stakeholders before the audit continues.

6.4.2 Assignment of work to the audit team

In consultation with the audit team, the audit team leader should assign responsibility for specific audit processes, functions, locations, areas or activities to each team member. The assignment should take into account the need for independence and competence of the auditors and efficient use of resources, as well as the different roles and responsibilities of auditors, trainees and technical experts. Changes in the assignment of work may be made as an enhancement of the audit to ensure that the audit objectives are met.

6.4.3 Preparation of working documents

Members of the audit team should analyze the information relevant to their audit responsibilities and prepare the working papers necessary to provide guidance and to record the audit process. Such working papers may include:

- checklists and audit sampling plans;

- and forms for recording information, such as forms and minutes of meetings to support audit evidence and data.

The use of checklists and forms should not limit the scope of the audit activity, which may change as a result of information obtained during the audit.

Working papers, including records resulting from their use, should be retained at least until the audit is completed. The retention of such documents at the end of the audit is described in Section 6.7. It is precisely those documents containing confidential and private information that should be properly retained at all times by the members of the audit team.

6.5 Audit field activities

6.5.1 Conduct of the kick-off meeting

An introductory meeting should be held with the auditee's management or those responsible for the audited processes or functions:

a) to approve the audit plan;

b) provide a summary description of the audit activities to be carried out;

c) to approve the channels for the exchange of information;

d) and provide the auditee with an opportunity to ask questions.

Practical help. Introductory meeting

In many cases, e.g. internal audit in a small company, the introductory meeting may simply be a briefing on the audit and an explanation of its nature.

In other audit situations, the meeting should be formal, and a record of attendance should be kept. The meeting should be chaired by the head of the audit team and should cover the following agenda items accordingly:

a)   Introduction of the participants, indicating their responsibilities;

b)   confirmation of the audit objectives, scope and criteria;

c)   Approval of the audit schedule and other relevant pre-audit actions, such as setting the duration and date of the final meeting, scheduling any interim meetings between the audit team and the auditee's management, and any subsequent changes;

d)   the methods and procedures to be applied in the audit, including informing the auditee that the audit evidence will be based on only a portion of the information available and will result in some degree of audit uncertainty;

e) confirmation of the formal channels of exchange of information between the audit team and the auditee;

f) confirmation of the language to be used during the audit;

g) confirmation of the fact that the auditee will be kept informed of the progress of the audit during the audit;

h) confirmation of the availability of all resources and equipment required by the audit team;

i) confirmation of issues relating to confidentiality;

j) confirmation of appropriate safety, accident and security procedures for the audit team's work;

k) confirmation of the presence, position and identity of any guides;

l) discussion of the method of reporting, including the method of classification of non-conformities;

m) informing of the conditions under which the audit may be terminated;

n) information on the system in place for appealing the conduct of the audit or the findings.

6.5.2 Communication during the audit

Depending on the scope and complexity of the audit, formal communication within the audit team and with the auditee during the audit may be necessary.

The audit team should meet periodically to share information, assess the progress of the audit and redistribute the work of audit team members as necessary.

During the audit, the audit team leader should periodically update the auditee and the audit client on the progress of the audit and on any other audit-related matters. The auditee and, as appropriate, the audit client should be promptly made aware of evidence gathered during the audit of potential immediate and significant risks (e.g. safety, environmental or quality). Any issue arising outside the scope of the audit should be noted and reported to the audit team leader so that the audit client and the auditee are informed.

Where available audit evidence indicates that audit objectives are not being met, the audit team leader should communicate the reasons to the audit client and the auditee so that appropriate action can be identified. Such actions may include re-approving or modifying the audit plan, modifying the audit objectives or the scope of the audit, or terminating the audit.

Any need for a change in the scope of the audit that becomes apparent during the on-site audit should be analyzed with the audit client and agreed by the audit client and the auditee, as appropriate.

6.5.3 Duties and responsibilities of guides and observers

Guides and observers may accompany the audit team but are not part of it. They should not influence or interfere with the audit.

When appointed by the auditee, guides should assist the audit team and act at the request of the audit team leader. Their responsibilities may include:

a) Establishing contacts and scheduling interviews;

b) arranging visits to specific sites or parts of the organization;

c) ensuring that responsibilities relating to local security and safety procedures are known and carried out by audit team members;

d) testifying to the audit for the benefit of the auditee;

e) clarifying or assisting in the collection of information.

6.5.4 Collection and verification of information

Information relating to the objectives, scope and criteria of the audit, as well as information relating to the interaction between functions, activities and processes, should be gathered during the course of the audit through appropriate sampling and must be verified. Only information that can be verified can constitute audit evidence. Audit evidence should be recorded. Audit evidence is based on samples of available information. There is therefore a degree of uncertainty in the conduct of an audit and those who act on audit findings should be aware of this.

Figure 3 provides an overview of the process from information gathering to audit conclusions.

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│  Informacijos rinkimas tinkamai │
│  atrenkant bandinius ir tikrinimas │
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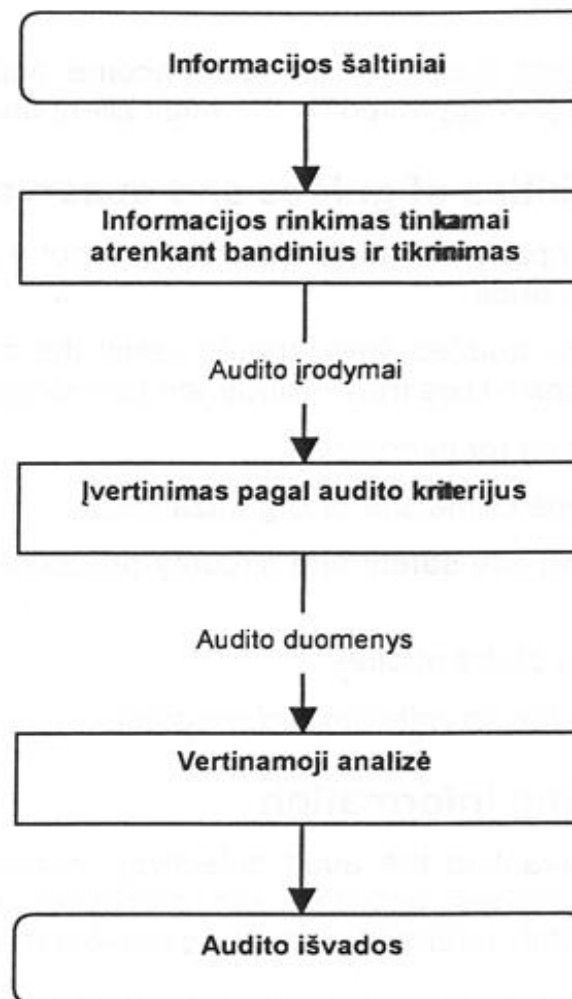
3 paveikslas. Proceso nuo informacijos rinkimo iki audito išvadų apžvalga

Informacijos rinkimo metodai:

- interviu;
- veiklos stebėjimas; ir
- vertinamoji dokumentų analizė.

Practical help. Sources of information

The sources of information chosen may vary depending on the scope and complexity of the audit. They may include:

a) interviews with staff and others;

b) observations of operations and working environment and conditions;

c) documents such as policies, objectives, plans, procedures, standards, instructions, licenses and permits, specifications, drawings, contracts and orders;

d) records such as control records, minutes of meetings, audit reports, records of monitoring programmes and measurement results;

e) data summaries, analyses and performance indicators;

f) information on the auditee's sampling programmes and procedures to manage sampling and measurement processes;

g) reports from other sources, e.g. feedback from the client, other relevant information from external parties, and evaluation of suppliers;

h) computer databases and websites.

Practical help. Conducting interviews

Interviewing is one of the most important tools for gathering information and should be carried out in a way that is adapted to the situation and the interviewee. However, the auditor should bear the following in mind:

a) Interviews should be conducted with persons at the appropriate levels of the functions, activities or tasks within the scope of the audit;

b) the interviews should be conducted during normal working hours and, were convenient, at the interviewee's normal place of work;

c) every effort should be made to ensure that the interviewee feels free and uninhibited before and during the interview;

d) the reason for the interview and any notes should be explained;

e) the interview can be started by asking the interviewees to describe their work;

f) questions that influence responses (i.e. ancillary questions) should be avoided;

g) the results of the interview should be summarized and reviewed with the interviewee;

h) interviewees should be thanked for their participation and cooperation.

6.5.5 Creating audit data

Audit evidence should be compared with the audit criteria to generate audit data. Audit evidence may indicate either compliance or non-compliance with audit criteria. Where specified in the audit objectives, audit evidence can be used to identify opportunities for improvement.

The audit team should meet to analyze the audit data at certain points in the audit. Compliance with audit criteria should be summarized to identify the locations, functions or processes that have been audited. If included in the audit plan, individual audit findings of compliance and supporting evidence should also be documented.

Non-conformities and supporting audit evidence should be recorded. Non-conformities may be classified. They should be analyzed with the auditee to confirm that the audit evidence is accurate and that the non-conformity is understood. Every attempt should be made to resolve any conflicts that arise in relation to the audit evidence and/or data, and the issues resolved should be recorded.

6.5.6 Preparation of audit conclusions

The audit team should deliberate before the final meeting:

a)   to analyze the audit data and any other information gathered during the audit in accordance with the audit objectives;

b)   to agree on the audit conclusions, taking into account the uncertainties inherent in the audit process;

c)   to make recommendations where specified in the audit objectives;

d)   and to discuss surveillance audits, if included in the audit plan.

Practical assistance. Audit findings

Audit findings may relate to matters such as:

e) the degree of compliance of the management system with the audit criteria;

f) the effective implementation, maintenance and improvement of the management system;

g) and the ability of evaluative management analysis to ensure the continuing suitability, adequacy, effectiveness and improvement of the management system.

If the audit objectives provide for it, the audit findings may be accompanied by recommendations relating to improvement, business liaison, certification or registration activities or future audits.

6.5.7 Conduct of the final meeting

A final meeting, chaired by the audit team leader, should be held to present the audit findings and conclusions so that they are known and understood by the auditee, and to agree on a time when the auditee should submit a corrective and preventive action plan. The closing meeting should include the auditee, the audit client and other parties. If necessary, the audit team leader may inform the auditee of situations that have arisen during the audit that may reduce confidence in the audit findings.

In many cases, such as an internal audit of a small company, the closing meeting is simply a presentation of the audit findings and conclusions.

In other cases, the meeting should be formal, and minutes and records of attendance should be kept.

Any disagreements between the audit team and the auditee concerning the audit findings and/or conclusions should be investigated and, if possible, resolved. If the disagreement is not resolved, it should be recorded.

Recommendations for improvement should be made where specified in the audit objectives. It should be stressed that these recommendations are not binding.

6.6 Preparation, approval and distribution of the audit report

6.6.1 Preparation of the audit report

The audit team leader should be responsible for the preparation and content of the audit report.

The audit report should accurately, concisely and clearly describe the audit as a whole and should include the following:

a) the objectives of the audit;

b) the scope of the audit, in particular the identification of the organizational and functional units or processes to which the audit will relate and the timing;

c) identification of the audit client;

d) identification of the audit team leader and members;

e) the dates and locations of the audit;

f) audit criteria;

g) audit data;

h) audit findings.

The audit report may also include:

i) the audit plan;

j) a list of the auditee's representatives;

k) a summary of the audit process, including any uncertainties and/or impediments that may reduce the reliability of the audit findings;

l) confirmation that the audit objectives have been achieved within the scope of the audit in accordance with the audit plan;

m) any unaudited areas, although within the scope of the audit;

n) any unresolved disagreements between the audit team and the auditee;

o) recommendations for improvement, if specified in the audit objectives;

p) agreed plans for surveillance audits;

q) a statement on confidentiality of content;

r) audit report distribution lists.

6.6.2 Approval and distribution of the audit report

The audit report should be completed within the agreed time frame. If this is not possible, the reasons for the delay should be communicated to the audit client and a new date for the report should be agreed.

The audit report should be dated, reviewed and approved in accordance with the audit programme procedures. The validated audit report should be made available to those beneficiaries identified by the audit client.

The audit report is the property of the audit client. All recipients of the report should respect and maintain the confidentiality of the report.

6.7 Conclusion of the audit

The audit is complete when all activities described in the audit plan have been performed and the approved audit report has been distributed.

Documents relating to the audit should be retained or destroyed by agreement of the parties involved and in accordance with the procedures of the audit programme and applicable legal, regulatory and contractual requirements.

Unless required by law, the audit team and those responsible for the management of the audit programme should not disclose the contents of the documents and any other information obtained in the course of the audit, or the audit report, to any other party without the express approval of the audit client and, where appropriate, the auditee. If disclosure of the contents of audit documentation is required, the audit client and the auditee should be informed as soon as possible.

6.8 Conducting surveillance audits

Audit findings may indicate the need for corrective, preventive or improvement actions. The need for such action is normally a matter for the auditee to decide, within a specified timeframe, and is not considered part of the audit. The auditee should keep the audit client informed of the status of these actions.

The completeness and effectiveness of corrective actions should be verified. This verification may be part of a follow-up audit.
       The audit programme may specify the follow-up actions to be carried out by the members of the audit team in accordance with their competences. In such cases, steps shall be taken to preserve independence during follow-up audits.

7 Auditor competence and assessment

7.1 General

The reliability and assurance of the audit process depends on the competence of those carrying out the audit. This competence is based on;

- the personal qualities described in 7.2; and

- the ability to apply the knowledge and skills (see 7.3) acquired through education, employment, auditor training and auditing (see 7.4).

This concept of auditor competence is presented in Figure 4. Some of the knowledge and skills described in 7.3 are common to auditors of quality and environmental management systems, while some are specific to auditors of particular subjects.

Auditors increase, maintain and improve their competence through continuous professional development and regular participation in audits (see 7.5).

The evaluation process for auditors and the audit team leader is described in 7.6.
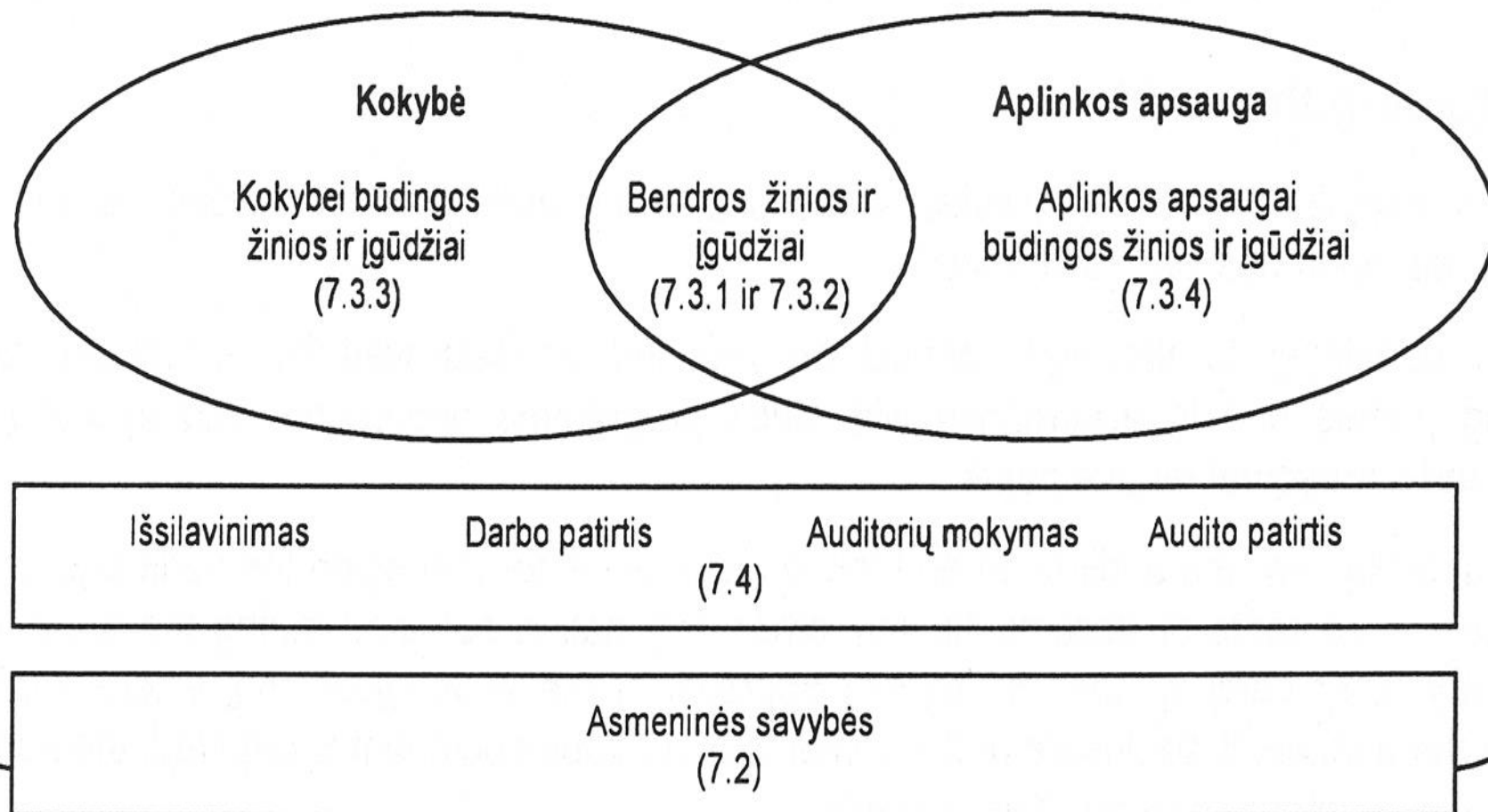
4 paveikslas. Kompetencijos koncepcija

7.2 Personal characteristics

Auditors should have the personal qualities that enable them to act in accordance with the audit principles described in Chapter 4.

An auditor should:

a)   Ethical, i.e. honest, truthful, honorable and discreet;

b)   broad-minded, i.e. willing to consider alternative ideas or approaches;

c)   Diplomatic, i.e. tactful when dealing with people;

d)   observant, i.e. actively observing the physical environment and activities;

e)   perceptive, i.e. instinctively aware and able to grasp a situation;

f)   Flexible, i.e. adapting quickly to different situations;

g)   persistent, i.e. persistent in pursuing goals;

h)   decisive, i.e. drawing timely conclusions based on logical reasoning and analysis;

i)   and self-confident, i.e. working and acting independently and interacting effectively with others.

7.3 Knowledge and skills

7.3.1 General knowledge of quality management system and environmental management system auditors

Auditors should have knowledge and skills in the following areas:

(a)   Audit principles, procedures and methodologies: to enable auditors to apply them appropriately to different audits and to ensure that audits are carried out consistently and systematically. The auditor should be able to:

-   Apply audit principles, procedures and methodologies;

-   plan and organize work effectively;

-   perform the audit within the agreed time frame;

-   priorities and focus on significant matters;

-   gather information effectively by interviewing, listening, observing and analyzing documents, records and data;

-   understand the appropriateness and implications of sampling techniques for auditing;

-   verify the accuracy of the information collected;

-   confirm the sufficiency and relevance of audit evidence to support audit findings and conclusions;

-   assess those factors that may affect the reliability of audit data and conclusions;

-   use working papers to record audit activities;

-   prepare audit reports;

-   maintain the confidentiality and security of information; and

- communicate effectively, either by applying your own personal linguistic skills or through a translator.

(b) Management systems and reference documents: enable the auditor to understand the scope of the audit and apply the audit criteria. Knowledge and skills in this area should include:

- the application of management systems to different organizations;

- the interaction of management system components;

- the quality or environmental management system standards, applicable procedures or other management system documents used as audit criteria;

- the differences between reference documents and their priorities;

- the application of reference documents in different audit situations; and

- information systems and technologies for the validation, protection, distribution and management of documents, data and records.

(c) Organizational situations: enables the auditor to understand the activities of the organization. Knowledge and skills in this area should include:

- the size, structure, functions and relationships of the organization;

- general business processes and related terminology; and

- the cultural and social customs of the auditee.

(d) Applicable laws, regulations and other requirements relevant to the matter: enable the auditor to work in accordance with and be aware of the requirements applicable to the audited organization. Knowledge and skills in this area include:

- local, regional and national codes, laws and regulations;

- contracts and agreements;

- international treaties and conventions; and

- other requirements declared by the organization.

7.3.2 Overall knowledge and skills of audit team leaders

Audit team leaders should have additional knowledge and audit management skills to facilitate efficient and effective audit performance. The audit team leader should be able to:

- Plan the audit and use resources effectively during the audit;

- represent the audit team in dealing with the audit client and the auditee;

- organize and manage the members of the audit team;

- provide guidance and direction to trainee auditors;

- lead the audit team to reach the audit conclusions;

- avoid and resolve conflicts;

- prepare and finalize the audit report.

7.3.3 Knowledge and skills of quality management system auditors

Quality management system auditors should have knowledge and skills in the following areas:

(a) Quality-related methods and methodologies enables auditors to analyze quality management systems and to develop relevant audit data and conclusions. Knowledge and skills in this area include:

- quality terminology

- quality management principles and their application; and

- quality management tools and their application (e.g. statistical process management failure mode and effect analysis, etc.).

(b) Processes and products, including services:

- enables the auditor to understand the technological context in which the audit should be performed. Knowledge and skills in this area include: sector-specific terminology;

- technical characteristics of products, processes and services;

- and sector-specific processes and practices.

7.3.4 Knowledge and skills of environmental management system auditors

Environmental management system auditors should have knowledge and skills in the following areas:

(a) Environmental management techniques and methodology: enables auditors to analyze environmental management systems and to develop appropriate audit data and conclusions. Knowledge and skills in this area should include:

- Environmental terminology;

- environmental management principles and their application; and

- environmental management tools (e.g. assessment of environmental aspects/impacts, life cycle assessment, environmental performance assessment, etc.).

(b) Environmental science and technology: enables the auditor to understand the basic relationships between human activities and the environment. Knowledge and skills in this area should include:

- the impact of human activities on the environment;

- interactions between ecosystems;

- environmental media (e.g. land, air, water);

- management of natural resources (e.g. fossil fuels, water, flora and fauna);

- general methods of environmental protection.

c) Technical aspects of operations and their environment: enables the auditor to understand the interactions between the auditee's operations, products, services and activities and the environment. Knowledge and skills in this area should include:

- sector-specific terminology;

- environmental aspects and impacts;

- methods for assessing the significance of environmental aspects;

- crisis characteristics of products and services in operational processes;

- monitoring and measurement techniques; and

- pollution prevention technology.

7.4 Education, work experience, auditor training and audit experience
7.4.1 Auditors

Auditors should be educated, have completed auditor training and have the following audit experience:

(a) They should have completed training sufficient to acquire the knowledge and skills described in 7.3;

(b) They should have work experience that contributes to the development of the knowledge and skills described in 7.3.3 and 7.3.4. This work experience should be gained in technical, managerial or specialist roles involving the preparation of reports, problem solving and interacting with other managerial or specialist staff, clients and other stakeholders.

   Some work experience should be gained in roles where the actions performed contribute to the development of skills and knowledge. This includes:

-   in the field of quality management, quality management system auditors; and

-   in the field of environmental protection, for auditors of an environmental system.

(c) They should have completed auditor training courses that contribute to the knowledge and skills described in 7.3.1, 7.3.3 and 7.3.4. This training may be organized by the auditing organization or by an external organization.

(d) They should have the audit experience described in Chapter 6. This experience should be gained under the guidance and recommendation of an auditor who is competent as an audit team leader in that area.

NOTE: The degree of guidance and recommendations (here, 7.4.2, 7.4.3 and Table 1) necessary for the conduct of an audit is at the discretion of the persons responsible for the management of the audit programme and the audit team leader. The provisions of the instructions and recommendations do not imply continuous supervision and do not require that any one person be designated to perform this task.

7.4.2 Audit team leaders

The audit team leader should gain additional audit experience as a result of improving his or her knowledge and skills as described in 7.3.2. This additional experience should be gained in his or her capacity as audit team leader, under the direction and guidance of another auditor who is competent as audit team leader.

7.4.3 Auditors auditing both quality and environmental management systems

Auditors of a quality management system or an environmental management system who wish to become auditors of a second discipline should:

(a) have the training and work experience necessary to acquire the knowledge and skills required for the second discipline; and

(b) have carried out an audit involving a second discipline management system under the direction and guidance of an auditor who is competent as a second discipline audit team leader.

The head of an audit team in one discipline should meet the above guidelines in order to become the head of an audit team in another discipline.

7.4.4 Levels of education, work experience, auditor training and audit experience

Organizations should determine the levels of education, work experience, auditor training and audit experience required for an auditor to acquire the knowledge and skills appropriate to the audit programme when applying steps 1 and 2 of the assessment process described in 7.6.2.

Experience has shown that the levels shown in Table 1 are appropriate for auditors performing certification or similar audits. Higher or lower levels may apply depending on the audit programme.

1 lentelė. Auditorių, atliekančių sertifikavimo ar panašius auditus, išsilavinimo, darbo patirties, auditorių mokymo ir audito patirties lygiai

Parametras	Auditorius	Abiejų disciplinų auditorius	Audito grupės vadovas
Išsilavinimas	Vidurinis išsilavinimas (žr. 1 pastabą)	Tas pat kaip ir auditoriui	Tas pat kaip ir auditoriui
Bendra darbo patirtis	5 metai (žr. 2 pastabą)	Tas pat kaip ir auditoriui	Tas pat kaip ir auditoriui
Darbo patirtis kokybės ar aplinkos apsaugos vadybos srityje	Mažiausiai 2 metai iš bendrų 5 metų	2 metai (antroji disciplina) (žr. 3 pastabą)	Tas pat kaip ir auditoriui
Auditorių mokymai	40 h auditorių mokymo	24 h antrosios disciplinos mokymo (žr. 4 pastabą)	Tas pat kaip ir auditoriui
Audito patirtis	Visų keturių auditų, trukusių mažiausiai 20 dienų, patirtis, dalyvaujant auditoriui stažuotojui, vadovaujant tokiam kompetentingam auditoriui, kaip audito grupės vadovas (žr. 5 pastabą). Auditai turėtų būti baigti per pastaruosius trejus metus iš eilės.	Trys užbaigti auditai, trukę mažiausiai 15 dienų, mokantis antrosios disciplinos ir vadovaujant tokiam kompetentingam auditoriui, kaip antrosios disciplinos audito grupės vadovas (žr. 5 pastaba). Auditai turėtų būti baigti per pastaruosius dvejus metus iš eilės.	Trijų užbaigtų auditų, trukusių mažiausiai 15 dienų, patirtis, atliekant audito grupės vadovo vaidmenį, vadovaujant kompetentingam audito grupės vadovui (žr. 5 pastabą). Auditai turėtų būti baigti per pastaruosius dvejus metus iš eilės.

1 PASTABA: Vidurinis išsilavinimas yra nacionalinės švietimo sistemos dalis, kuri seka po pradinio ar pagrindinio mokymosi, baigto prieš įstojant į universitetą ar panašaus lygio švietimo įstaigą.

2 PASTABA: Darbo patirties metų skaičius gali būti sumažintas 1 metais, jei asmuo baigė atitinkamus mokslus po vidurinės mokyklos baigimo.

3 PASTABA: Antrosios disciplinos darbo patirtis gali sutapti su pirmosios disciplinos darbo patirtimi.

4 PASTABA: Antrosios disciplinos mokymasis - tai įgyti žinių apie atitinkamus standartus, įstatymus, reglamentus, principus, metodus ir metodikas.

5 PASTABA: Užbaigtas auditas yra auditas, apimantis etapus, aprašytus nuo 6.3 iki 6.6. Bendra audito patirtis turėtų apimti visą vadybos sistemos standartą.

7.5 Maintaining and improving excellence

7.5.1 Continuous professional development

Continuous professional development is about maintaining and improving knowledge, skills and personal qualities. This may be achieved by means such as additional work experience, training, private study, coaching, participation in meetings, seminars and conferences or other similar activities. Auditors should continuously upgrade their qualifications.

Continuous professional development activities depend on the needs of the individual and the organization, changes in auditing practices, standards and other requirements.

7.5.2 Maintaining audit capability

Auditors should maintain and demonstrate their audit capability by regularly participating in audits of quality and/or environmental management systems.

7.6 Auditors' assessment

7.6.1 General

The evaluation of auditors and audit team leaders should be planned, implemented and recorded in accordance with the procedures of the audit programme so that it is objective, consistent, fair and reliable. The evaluation process should identify training and skills development needs.

Auditors are evaluated in the following stages:

- Initial assessment of individuals wishing to become auditors;

- the assessment of auditors as part of the audit team selection process described in 6.2.4;

- ongoing assessment of auditors' performance to identify needs for maintaining and improving knowledge and skills.

Figure 5 shows the relationship between these assessment phases.
        The process steps described in 7.6.2 can be adapted to each of these assessment steps.
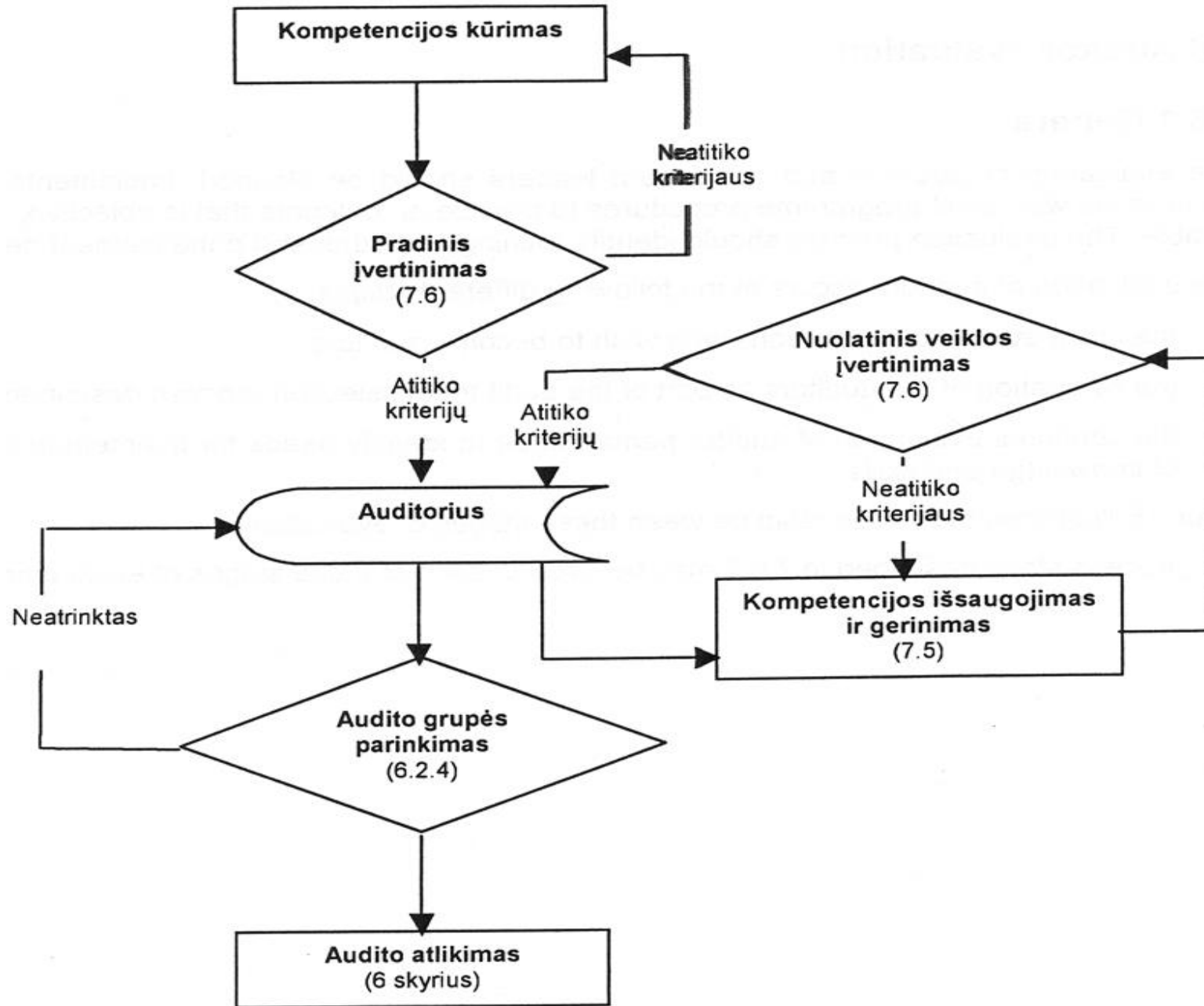
5 paveikslas. Įvertinimo etapų ryšiai

7.6.2 Assessment process

The evaluation process consists of four main steps.

Step 1. Identify the personal qualities, knowledge and skills that match the needs of the audit programme

In deciding on the suitability of knowledge and skills, the following should be taken into account:

- the size, nature and complexity of the organization to be audited;
- the objectives and scope of the audit programme;
- certification/registration and accreditation requirements;
- the role of the audit process in the management of the audited organization;
- the level of confidence envisaged in the audit programme;
- the complexity of the management system under audit.

Step 2. Determine the assessment criteria

The criteria may be quantitative (e.g. years of experience and education, number of audits performed, hours of audit training) or qualitative (e.g. personal qualities, knowledge or skills demonstrated through training or on-the-job experience).

Step 3. Selecting the appropriate evaluation method

The assessment should be carried out by an individual or group of professionals using one or more of the methods selected from Table 2. When using Table 2, it should be taken into account that:

- the methods listed are indicative of the options available and may not apply in all situations;

- the reliability of the different methods may vary;

- in general, a combination of methods should be used to achieve an objective, consistent, fair and reliable assessment.

Step 4. Carrying out the assessment

The information gathered about the person is compared with the criteria set out in Step 2. Where the individual does not meet the criteria, additional training, work and/or audit experience is required and should be followed by a reassessment.

An example of how the steps in the assessment process can be applied to a hypothetical internal audit programme and documented is shown in Table 3.

2 lentelė. Vertinimo metodai

Vertinimo metodas	Tikslai	Pavyzdžiai
Įrašų analizė	Patikrinti auditoriaus biografiją	Įrašų apie išsilavinimą mokymus, darbą ir audito patirtį analizė
Teigiama ir neigiama grįžtamoji informacija	Pateikti informaciją apie tai, kaip vertinama auditoriaus veikla	Apklausos, anketos, asmeninės rekomendacijos, liudijimai, skundai, veiklos įvertinimas, kolegų analizė
Interviu	Įvertinti asmenines savybes ir bendravimo įgūdžius, patikrinti informaciją bei žinias ir gauti papildomos informacijos	Akis į akį ir interviu telefonu
Stebėjimas	Įvertinti asmenines savybes ir sugebėjimą taikyti žinias ir įgūdžius	Vaidmens atlikimas, paliudyti auditai, darbinė veikla
Testavimas	Įvertinti asmenines savybes, žinias ir įgūdžius bei jų taikymą	Egzaminai žodžiu ir raštu, psichometriniai testai
Vertinamoji analizė po audito	Pateikti informaciją kur tiesioginis stebėjimas gali būti negalimas ar netinkamas	Peržiūrėti audito ataskaitas ir diskusijas su audito klientu, audituojamuoju, kolegomis ir su auditoriumi

3 lentelė. Auditoriaus įvertinimo proceso taikymas hipotetinėje vidaus audito programoje

Kompetencijos sritys	1-asis žingsnis. Asmeninės savybės, žinios ir įgūdžiai	2-asis žingsnis. Įvertinimo kriterijai	3-iasis žingsnis. Įvertinimo metodai
Asmeninės savybės	Etiškas, plačių pažiūrų, diplomatiškas, pastabus, įžvalgus, lankstus, atkaklus, ryžtingas, pasitikintis savo jėgomis	Patenkinama veikla darbo vietoje	Veiklos įvertinimas
Bendros žinios ir įgūdžiai			
Audito principai, procedūros ir metodika	Sugebėjimas atlikti auditą pagal vidaus procedūras, bendraujant su žinomos darbo vietos kolegomis	Užbaigtas vidaus auditorių mokymo kursas Atlikti trys auditai, būnant vidaus audito grupės nariu	Mokymo įrašų analizė Stebėjimas Kolegų analizė
Vadybos sistemos ir nuorodiniai dokumentai	Sugebėjimas taikyti atitinkamas Vadybos sistemos vadovo dalis ir susijusias procedūras	Perskaitytos ir suprastos Vadybos sistemos vadovo procedūros, susijusios su audito tikslais, taikymo sritimi ir kriterijais	Mokymo įrašų analizė Testavimas Interviu
Organizacijos situacijos	Sugebėjimas veikti efektyviai pagal organizacijos kultūros ir organizacinės bei atsiskaitymo struktūros reikalavimus	Darbas organizacijoje mažiausiai vienerius metus einant prižiūrėtojo pareigas	Darbo įrašų analizė
Taikomi įstatymai, reglamentai ir kiti reikalavimai	Sugebėjimas nustatyti ir suprasti, kaip taikyti atitinkamus įstatymus, reglamentus, susijusius su procesais, produktais ir (arba) teršalų išmetimu į aplinką	Baigtas mokymo kursas, kurio tema - įstatymai, susiję su audituojama veikla ir procesais	Mokymo įrašų analizė

Žinios ir įgūdžiai, būdingi kokybės vadybos sistemai			
Metodai ir metodika, susiję su kokybe	Sugebėjimas aprašyti vidinius kokybės valdymo metodus Sugebėjimas atskirti procesinio ir galutinio bandymo, tyrimo reikalavimus	Užbaigti kokybės valdymo metodų taikymo mokymai Darbovietes naudojimas vykstant procesui ir atliekant galutinės kontrolės procedūras	Mokymo įrašų analizė Stebėjimas
Procesai ir produktai, įskaitant paslaugas	Sugebėjimas nustatyti produktus, jų gamybos procesą, specifikacijas ir galutinį vartojimą	Gamybos planavimo darbas einant proceso planavimo tamsiojo pareigas Darbas aptarnavimo skyriuje	Darbo įrašų analizė
Žinios ir įgūdžiai, būdingi aplinkos vadybos sistemai			
Aplinkos vadybos metodai ir metodika	Sugebėjimas suprasti aplinkos apsaugos veiklos vertinimo metodus	Užbaigti aplinkos apsaugos veiklos įvertinimo kursai	Mokymo įrašų analizė
Aplinkos mokslas ir technologija	Sugebėjimas suprasti, kaip taršos prevencijos ir valdymo metodai, taikomi organizacijoje, daro įtaką reikšmingiems aplinkos apsaugos	Šešių mėnesių darbo, susijusio su taršos prevencija ir valdymu panašioje gamybos aplinkoje, patirties	Darbo įrašų analizė
Veiklos techniniai ir aplinkos apsaugos aspektai	Sugebėjimas atpažinti organizacijos aplinkos apsaugos aspektus ir jų poveikį (pvz., medžiagas, jų tarpusavio reakciją ir potencialų poveikį aplinkai išsiliejimo atveju). Sugebėjimas įvertinti avarijų likvidavimo procedūras, taikomas aplinkos apsaugoje	Užbaigti mokymo kursai apie medžiagų saugojimą, maišymą, naudojimą, sunaikinimą ir jų poveikį aplinkai. Užbaigti kursai, kurių tema - avarijų likvidavimo planas, ir avarijų likvidavimo grupės nario patirtis.	Mokymo įrašų analizė, kursų turinys ir rezultatai. Mokymo ir darbo įrašų analizė.

Annex ZA (normative)

Normative references to international and relevant European publications

This European Standard incorporates by reference, dated or undated, provisions from other publications. These normative references are referred to in the appropriate places in the text and are given in this Annex. Subsequent amendments or revised editions of dated references are applicable to this standard only when they are incorporated as an amendment or revised edition. In the case of undated references, the most recent editions (with hyphens) apply.

NOTE: If an international publication is modified and marked (mod), the corresponding EN/HD applies.

Publication Year Title EN/HD

Year ISO 9000 2000

Quality management systems - EN ISO 9000 2000

Fundamentals and vocabulary (Quality management systems. Fundamentals, terms and definitions)

Topic:

"Quality Requirements"

Author
Erlandas Lazauskas

QUALITY REQUIREMENTS

Skilled-Up project

QUALITY REQUIREMENTS

Quality requirements are the expression of needs or the translation of needs into quantitative or qualitative values for the characteristics of an object, enabling it to be realized and evaluated. It is essential that the quality requirements reflect the expressed or implied needs of the customer. The term 'requirements' includes market, contractual, internal organizational and other institutional requirements. The requirements of society have a very strong influence on product characteristics. These include obligations imposed by laws, regulations, rules, norms, statutes, environmental protection, health, safety, energy and natural resource conservation. Quantified performance requirements include nominal values, tolerances and limits, etc. The content of the requirements and their quantitative values depend on the product concerned. However, there are general and universal requirements that can describe the quality of any product. Without claiming absolute completeness, we will try to discuss here the main universal requirements which are independent of the product.

Customer (user) requirements

- *Fitness for purpose*
- *A product can only fulfil one function, meeting one customer need at a high level. However, another product may also perform the main function and some additional ones. This product would perform less well in the main function. However, the customer would also want additional functions, a situation which is met by the use of special-purpose and multi-purpose products. The customer has to answer the following questions when selecting a product: Is a special purpose product that performs one function perfectly better? Or is it better to have a multi-purpose product that performs several functions?*

Functionality

This is the ability to perform a given function without disruption. This characteristic depends on the perfection (quality) of the product's design. Some of the factors that characterize the perfection of a structure are: unambiguity, simplicity, load transfer, self-adjustment, stability, compatibility of deformations of parts, counterbalancing of loads, integration and separation of the functions of the elements, etc. The content of these and other properties is the subject of structural science.

Reliability

- The ability of a product to perform its functions for a specified period of time and to maintain within the permitted values of specified performance characteristics, consistent with the particular performance of the product in use and the conditions of servicing, repair, storage and transport. Reliability is characterized by perishability, durability, reparability and survivability. This requirement, because of its importance, is addressed separately.

Ease of servicing

- The product must make it as easy as possible to start up, operate and complete the work. Instructions for commissioning, servicing and maintenance of the product shall be easy to understand, specific and shall not require "deep scientific" study.

Ease of maintenance

- The product must be easy to clean and maintain. A perfect product is one that requires no maintenance. Blind holes, cracks, rough surfaces, sharp edges, etc. are signs of a problematic product as they make cleaning and other maintenance difficult. If the product needs to be periodically lubricated, the lubrication points shall be easily accessible.

Ergonomics

- Ergonomics is a product characteristic that describes the relationship between people and the product during its operation. A design is ergonomic if it optimises the biomechanical, physiological and psychological capabilities of the human being. This can be achieved by adapting the product to a specific person or group of people. The person using the product then consumes the least amount of energy, is comfortable, does not get tired longer, etc.

Ergonomic requirements are governed by standards and various guidelines. Here are the main features that can be used to assess a product's level of ergonomics:
1. Function
- The nature of the function performed by the product
- The nature of human action
2. Principle of operation
- The nature and intensity of the physical or chemical process
- The effects (consequences): vibration, noise, radiation, heat, etc.
3. Structural properties Character
- Nature of the elements, structure, nature of the effect

Shape
- General shape and shape of elements in relation to the requirements of the human body
- Symmetry and proportions
- Modernity of form Position
- Arrangement, spacing
- Directions of operation and observation
- Modernity of form Size
- General dimensions, dimensions of manipulation elements, dimensions of contact surfaces Quantity
- Quantity, number and distribution

Energy
- Setting force and travel
- Resistance force, damping
- Pressure, temperature, humidity Material
- Colour and surface properties
- Contact properties: gripping, skin-friendly, etc.

Information
- Signs, symbols, fonts Safety
- Non-hazardousness
- Absence of hazardous sources and locations
- Absence of hazardous movements
- Protective equipment

Security

The safety requirement means that the technical function to be performed must be carried out reliably and without risk to people and the environment. Safety issues are addressed in three ways: directly, indirectly and through instructions.

The direct approach to safety is the best. It is based on the selection of design solutions that eliminate the possibility of hazards occurring. If such solutions cannot be found, then indirect measures are used to ensure safety. This is achieved through the use of various security systems. Safety instructions only warn how to avoid a hazard, but do not eliminate or protect against the source of the hazard itself.

Safety engineering requirements are governed by manuals and standards. They must be followed in the design process. The most comprehensive safety engineering requirements for the design are laid down in DIN 31000 - "Design of safe technical products". Products bearing the CE certification mark meet the safety requirements. These are defined by European standards and guidelines for the relevant product group.

Value for money:

Markets in developed countries are saturated with goods and services. Today's customers are much more price-sensitive than in the past. It has become common practice for customers to make intensive comparisons between the price and functionality of individual products before making a purchase decision. In order to succeed, the manufacturer must unconditionally comply with this demand from the demanding customer.

Degree of utility:

Increasing attention is being paid to the ratio of power consumed to power delivered. Typical examples of the results of this focus are: cars that use less fuel, refrigerators, washing machines, dishwashers that use less electricity. The development of heating appliances with a particularly high degree of efficiency. For the manufacturer, this means smaller masses moving with acceleration, lower heat dissipation (or higher heat dissipation in heating devices), lower friction, etc. The challenge for the manufacturer is to find the solution that best meets this important requirement.

Accessibility:

Good accessibility to the individual parts of the product facilitates maintenance and reduces maintenance time. This is especially true when it comes to replacing worn parts. The design must be such that replacement of a worn part does not require disassembly of other units.

Electromagnetic compatibility:

An increasing number of industrial products are equipped with electronic control, regulation and monitoring systems. The design must be insensitive to electromagnetic fields.

External appearance:

The aesthetic appearance of the product plays an important role in the market. There are no universally accepted rules that guarantee the optimum appearance of a product, nor can there be, as both products and their applications are very diverse. Consumer taste is a major influence. Taste has been disputed for over 2000 years. However, it is clear that the product must also be pleasing to the eye. This is determined by shape and colour. Aesthetic attributes are ambiguous. They depend on what the product is intended to emphasise.

Accordingly, all attributes can be divided into the following characteristic groups:

- market-oriented features;
- features emphasizing purpose;
- management and service highlighting features;
- features promoting the producer.

Market-oriented features:

It is important to identify the consumer groups to which the product is targeted. There may be specialist consumers and consumers who prefer prestige, nostalgia, avant-gardism, etc. Specific aesthetic attributes are identified according to the needs of these groups. In all cases, irrespective of the group, the general requirements for form must be embodied. These include:

- simplicity, unity, purity of style;

- proportionality, similarity;

- definiteness, emphaticity.

Signs of emphasis on purpose:

They must emphasize and distinguish the purpose inherent in certain consumer actions: the functional part, the place and manner of exposure, etc. E.g. the clamping system of a tool, the loaded part, the on-off elements, etc. The characteristic means of expression are external form, color and graphics.

Highlighting features of management and service:

The following features facilitate operation and maintenance:
- the management and service element must be centrally located in a prominent position, in a meaningful way;
- the design shall be compatible with the hand and foot space;
- the pick-up surfaces shall be distinguishable;
- the working condition must be emphasized;
- safety shall be emphasized by special markings and colors.

Attributes that promote the manufacturer:
They express the origin of the product and the style of the firm. For the manufacturer, these attributes are very important because they are synonymous with:
- confidence in the quality known and, in the guarantees, given;
- dependence on a certain level of technical development, etc.
This is achieved by the consistent use of highly visible, representative design elements. Their style and expression must be in keeping with the spirit of the times.   The following means of embodying aestheticism are characteristic: characteristic expression, structure, form, color, graphics.

Choice of expression The expression given to the product must be clearly recognizable, unified and consistent with its functional purpose. The means of expression are stability of form, lightness and compactness. Variation of the general form The general form must be emphasized, e.g. box, block, tower, L-shaped, C-shaped, O-shaped, T-shaped, etc.; individual areas must be highlighted: with smooth, similar or adaptable form elements.

Ensuring unity of form
- Use few variations in shape and position, e.g. only round shapes and horizontal orientation with respect to the longitudinal axis, only vertically oriented rectangular shapes;
- Shapes and lines of the elements must be adapted to the shape of the product. To this end, parting lines and planes may be used in assembly units. If such lines are not available, they must be artificially created. It is recommended to orient the edge lines to a single point or to keep them parallel during production! The shape of the elements and the direction and position of the lines should be such as to emphasize the expression. For example, horizontal and vertical lines on the surface of a product give the impression of being thrown in the respective directions.

Color reinforcement
- The color solution must be adapted to the form;
- Different colors must be kept to a minimum;
- In the case of multiple color tones, the predominant one must be distinguished. It is important to get the color contrasts right. For example, black should be combined with yellow, white with red, green or blue.
Use of graphics
- Use the same style of fonts and graphic symbols;
- Unity of expression is enhanced by uniformity in the method of production of graphic elements, e.g. etching only, engraving only, etc.;
- Match the size, shape and colors of the graphics to the shapes and colors of other elements.

3.2 Requirements from technical services and the public

Spare parts. The product must specify which parts are to be replaced and how they are to be replaced during operation, i.e. spare parts must be foreseen and identified. Spare parts may be not only individual parts but also sub-assemblies and assembly units. Permissible operating times must be defined for wearing parts so that preventive measures can be taken in time.

Tools Existing tools and devices must be suitable for the new product design.

Complementary parts. The product must make provision for the incorporation of component parts, i.e. parts manufactured by other companies, into the product to be purchased without problems.

Disassembly of connections. Disassembling joints is often a challenge during repairs. To ensure disassembly, the manufacturer must select appropriate material pores and effective measures against the effects of corrosion and ageing.

Technical diagnostics. In complex plant, machinery and appliances, it is essential to quickly record and locate a fault. This reduces downtime, reduces economic losses and increases the safety of technical systems. In complex technical systems, this function is performed by diagnostic systems. In cars, aeroplanes and other machines, computerized diagnostic systems must be integrated into the product at an early stage of its design.

Product manufacturability Design decisions have a major impact on production costs, time and quality!
The designer's task is to select the solutions that ensure the lowest production cost and time and the required quality. A product that meets these requirements is technological. The technological performance of a product is determined by:
* the technological performance of the structure,
* the technological performance of the parts,
* the technological performance of the choice of materials and workpieces,
* the use of standard and uniform parts,
* the documentation.

Technological efficiency is a task for the design and technological sciences.

Standardisation

A standard is a normative technical document that regulates the norms, rules and requirements for a product. It embodies scientific and technical achievements and state-of-the-art experience. A standard solution is the most expedient solution to a recurring problem.

The following may be standardized: structural elements and solutions, calculations, materials, technological processes, testing, etc.

Compliance with the requirements of standards provides the following benefits:
* simplifies design,
* facilitates production,
* enables interchangeability,
* increases cost-effectiveness,
* improves occupational safety and environmental protection,
* facilitates legal disputes,
* facilitates international cooperation and trade.

Types of standards according to their origin:
* internal company standards,
* national standards, e.g., European standards - EN, CEN - Comite Europeen de Normalisation, CENELEC
* Comitc Europeen de Normalisation Electrotechniąues
* IEC Recommendations and Standards;
-International Electrochemical Commission
- International Electrochemical Commission
* ISO Recommendations and Standards International Organization for Standardization

Esant dideliai standartų pasiūlai, svarbu žinoti, kokiu mastu būtina jų laikytis.

Juridine prasme jų absoliučiai laikytis nereikalaujama. Tačiau nacionalinių ir tarptautinių standartų laikymasis palengvina teisinius ginčus. Tai ypač pasakytina apie saugumo standartus.

Siekiant ekonominio efektyvumo, standartų laikytis privalu. Tai ypač liečia įmonės standartus, galioja ir jis privalomas tol, kol jis netrukdo tenkinti techninius, ekonominius, saugumo ir estetinius reikalavimus.

Kuriant gaminį, reikia-įvertini i reikalavimus standartų, reglamentuojančių konstrukcines, technologines ir eksploatacines.gaminio savybes. Pagrindinės standartų naudojimo konstruojant gairės pateikiamos 3.1 lentelėje.

3.1 lentelė

Konstrukcinė sandara		Įvertinti standartai, reglamentuojantieji (nustatantieji)
Saugumas	• eksploatacinį ir darbo saugumą • aplinkos apsaugos Saugumo standartų reikalavimams reikia teikti pirmenybę prieš techninius ir ekonominius reikalavimus	
Pagaminimas	Privalu laikytis visų įmones standartų	
Kontrolė	bandymus ir kontrolę	
Surinkimas	• tolerancijas ir suleidimus • sujungimų elementus • bandymus ir kontrole	
Transportavimas	• transportavimo saugumą • apimtį ir • procesus	
Eksploatacija	• išaiškinimą • vartojimo tinkamumą	
Utilizavimas	• pakartotiną naudojimą • naudojimą pagal kitą paskirtį • pervertinimą	

Maintaining serviceability, The serviceability of a product decreases during operation. If no measures are taken, the product may become unsuitable for further use. Design measures can be taken to slow down the degradation of performance and at the same time ensure the product's serviceability for its entire lifetime.The following measures should be used to maintain the serviceability of the product:
* Maintenance. This enables the required condition to be maintained;
* Inspection. It identifies and assesses the existing condition;
* Repair. It enables the lost serviceability to be restored.

The content, scope, duration and time intervals of maintenance and inspection shall depend on the type of product, the functions it performs, the requirements imposed and the nature of its operation.

The measures to maintain serviceability are influenced by the physical processes that reduce the serviceability of the product: wear, corrosion, fatigue, etc.

There are two fundamentally different strategies used to maintain the performance of a product:

1. Restoring serviceability when the product fails. This strategy shall be used when failures are of an unpredictable nature. It is acceptable if the failure does not endanger human health and life, the environment or cause significant economic loss.

2. Maintenance of operability is taken care of in advance, in a preventive manner.

Preventive measures can be carried out at fixed intervals, after the product has been in service for a certain period of time or after a certain performance parameter has been reached.

Design measures Preference should be given to design solutions that ensure easy maintenance of performance:

* maintenance-free product,
* easy replacement of parts,
* equal resource of all parts.

The structural design shall ensure good accessibility to maintenance wires and ease of disassembly and reassembly. It is also desirable that the structure requires little or no preventive measures.
Only if it is not possible or not economical to provide these features should maintenance and inspection measures be envisaged. This strategy shall be implemented by:
* increasing reliability,
* preventing defects through disassembly, reassembly and re-commissioning,
* facilitating maintenance,
* ensuring that the results of maintenance can be monitored,
* facilitating inspections.

The inspection identifies and assesses the current state of the product. A better product is one that requires fewer inspections. The number and extent of inspections can be significantly reduced by embodying immediate safety and high reliability in the design, by providing overload protection measures, etc. The following design measures and solutions also help to reduce the need for and volume of maintenance and inspections:
* self-adjustment,
* simplicity of design,
* use of standard parts,
* good accessibility to the areas and elements to be maintained and inspected,
* good disassembly,
* modular design,
* use of uniform auxiliary materials.

Inspection and maintenance sites must be clearly marked.

The design of the facilities for maintenance and inspection shall meet ergonomic and safety requirements.

Utilisation

The aim of recycling is to save raw materials and materials. Production waste and products can be recovered.

The recovery of production waste is its use in other production processes.

Recycling of products is carried out after they have reached the end of their useful life or after they have fulfilled their assigned function. Products can be disposed of in two ways: by keeping them unchanged and by changing their original form. Without changing the original form, products can be reused for the same and other purposes with lower requirements. If this is technically impossible or uneconomic, the used products - scrap - are recycled into the original materials. This process is the recovery of products by changing their original form and value.

The processing of products into starting materials is characterized by the following preparation operations: breaking down, pressing (densification), crushing, separation of different materials. If the products are to be reused, they must first be restored to working order or adapted to their intended use. Typical technological operations are disassembly, cleaning, inspection and sorting of parts, repair of worn areas, adaptation of new parts, reassembly and inspection. It is necessary to know at the design stage how the product will be disposed of. The design solutions must enable the recovery operations to be carried out in the most favorable way.

If the product is to be recycled into materials at the end of its service life, the design of the product must ensure that:

1. Compatibility of materials,

The parts of the assemblies to be disassembled must be made of materials that are compatible with each other when the assemblies are recycled, i.e. to enable economic recycling without loss of the original quality of the materials.

2. Separability of materials

If it is not possible to combine materials, products and assemblies without disassembling them, the design must include separating joints to allow the product to be divided into groups of mutually compatible materials.

3. Good destructibility

The breaking of products should take precedence over crushing and pressing. Good product disassembly means that joints are easy to disassemble, easily accessible and located on the outside of the product. Cost-effectiveness of disassembly is due to the use of simple tools and low-skilled workers. The latter requirement is particularly important in the case of dismantling on scrap yards.

4. Separability of high quality and expensive materials
They must be specially marked and their parts easily separable.

5. Separation of hazardous materials

If the product is to be reused, the design solution must allow
* easy disassembly without damage,
* easy cleaning,
* control and sorting of parts and assemblies,
* surface coating if a part needs to be adapted to others,
* reassembly in single and small series production.
In addition, the wear surfaces shall be arranged on special elements which can be adjusted or replaced. The state of wear shall be easily identifiable. The worn areas shall be capable of being covered with base materials. Provision shall be made for structural measures against rusting of destructive joints.

Environmental friendliness

Today, the importance of environmental protection has increased dramatically. The role and responsibility of the constructor is particularly important in meeting environmental requirements. These requirements are governed by laws and instructions which the designer must comply with. Strict regulations apply to noise levels, the composition of exhaust gases and effluents, etc. It is now possible to ensure that the product can be disposed of without problems once it has served its time. Finding solutions to ensure the decontamination of plastics and heavy metals is not easy.

In developed countries, environmental guidelines are constantly being tightened. Some of them require the manufacturing company to take care of the disposal or recycling of the product at the end of its useful life.

Packaging, storage, transport

It is too early to be happy that a high-end product has been born at the end of a technological process. It must reach the consumer with its properties intact. The product does not reach the consumer immediately; it spends some time in storage and transport.

The storage and transport processes can be very unfavorable to the product and can substantially impair its performance. To prevent this from happening, products must be packaged. The importance of packaging cannot be overestimated.

In developed countries, the average cost of packaging is 2% of the product price.

Functions and requirements of packaging:
* protection against external influences;
* preservation;
* advertising and information;
* recyclability;
* repurposability;
* environmentally sound disposal.
These packaging characteristics are of varying importance for all products.
Ensuring the required characteristics is a packaging design task.

Protection against external influences. It is not enough to know the mode of transport.

It is necessary to know:

* the vibration and shock characteristics during the intended transport and

* the climatic stress parameters during storage and transport.

Preservation. The interaction between the product and the packaging in a climatic environment should be studied.

Advertising and information. This characteristic is particularly important for consumer products. The means of expression are very varied. They must meet customer preferences. Possibility of environmentally sound destruction. This requirement is becoming particularly important today, as environmental protection requirements are increasing, and environmental laws are becoming more stringent.

Topic:

"ISO 14001 - environmental management systems for enterprises"

Author
Erlandas Lazauskas

ISO 14001 - environmental management systems for enterprises

E.Lazauskas

ISO 14001 - environmental management systems for enterprises

- Rationale and benefits of implementing environmental management systems: the development of an **environmental management system** (EMS) helps to clarify, identify and activate the many technological, technical and organizational options available in an enterprise that can be used to address environmental problems. It is very important that this voluntary environmental tool is available to a wide range of companies, not only in manufacturing but also in other types of enterprises. Global practice shows that EMSs can reduce a company's environmental impact by 20-30%.

ISO 14001 - environmental management systems for enterprises

- ISO 14000, unlike other environmental management standards, is neither quantitative nor technology-oriented. The models presented in the standard indicate the elements of the management system that a company must implement in order to achieve its environmental objectives. The company must have in place and verify the established procedures, the necessary documentation and the responsible persons. The main document in this series of standards, ISO 14001, does not impose absolute requirements on the company in terms of environmental impact, except that the organisation must declare in a specific document its intention to comply with international and national standards.

ISO 14001 - environmental management systems for enterprises

- **Better environmental management** reduces energy consumption and waste by controlling and measuring operational processes to improve energy efficiency and reduce waste. This reduces operating costs and improves operational efficiency.

ISO 14001 - environmental management systems for enterprises

- **Minimize the likelihood of incidents**

The likelihood of incidents that could lead to environmental pollution and fines for the company is reduced.

ISO 14001 - environmental management systems for enterprises

- Demonstrates an ambition to expand their business opportunities

1. A certified environmental management system provides a competitive advantage when participating in public procurement tenders in the Republic of Lithuania.

2. Some public procurement tenders specify that the supplier must have an ISO 14001 certified environmental management system.

3. Some of your business customers purchase goods and services only from suppliers with an ISO 14001 certified environmental management system.

4. The implementation of an environmental management system provides more opportunities for exporting goods and services, especially to the Scandinavian market.

ISO 14001 - environmental management systems for enterprises

- **Improves the image of the organization**

Makes it easier for the organization to establish business contacts, obtain permits and licenses. Declaring environmentally friendly activities attracts more customers.

ISO 14001 - environmental management systems for enterprises

- **Helping you prepare for a changing business environment**

Focusing on environmental issues and striving for sustainable development gives you a competitive edge.

ISO 14001 - environmental management systems for enterprises

- ISO 14001 is easily compatible with other management standards such as the quality management standard ISO 9001 and the occupational health and safety management standard OHSAS 18001.

ISO 26000 is the standard for social responsibility guidelines

- Business and other organizations do not exist in a vacuum. The relationship between organizations and society and the environment is an important aspect of their activities. ISO 26000 provides guidance for organizations on how to contribute to the health and well-being of society in an ethical and transparent manner. Declared social responsibility is becoming one of the key features of a sound business.

- ISO 26000 is a guidance standard, not a requirement, and is not certified. The standard provides terms, definitions and principles of social responsibility. It also provides guidance on how to integrate social responsibility into an organization.

ISO 26000 is the standard for social responsibility guidelines

- The author of the international standards points out that ISO 26000:

- is intended for all types of organizations, in both the public and private sectors, in developing and developed countries;

- contributes to existing socially responsible practices;

- is useful in developing an international consensus on the definition and meaning of corporate social responsibility (CSR), and therefore identifies the key OSA (Organizational Social Responsibility) areas where a company needs to focus its efforts;

- provides guidance to translate the principles of CSR into effective action, as well as to promote the dissemination of good practice in CSR globally.

ISO 26000 is the standard for social responsibility guidelines

- **Social responsibility areas according to ISO 260001.**
- Environment
1. Environmental protection
2. Workplace - Employment Practices
3. Ethical practices
4. Relationship with consumers
5. Society – Community
6. Organization Management
7. Human Rights

ISO 26000 is the standard for social responsibility guidelines

- **Benefits of ISO 26000 for your organization**

1. Improves the social climate in your organization

2. Increases employee motivation and reduces employee turnover

3. Increases customer satisfaction

4. Motivated employees increase the reliability and quality of the organization's performance

5. The image of the company is improved

6. Social responsibility initiatives improve the company's reputation

ISO 26000 is the standard for social responsibility guidelines

- ISO 26000 is easily compatible with other management standards such as the quality management standard ISO 9001, the environmental management standard ISO 14001 and the occupational health and safety management standard OHSAS 18001.

ISO 50001 – standartas energijos efektyvumo didinimui

- Every year, energy resources become more expensive. For organizations, energy costs are a growing part of their costs. Reducing energy consumption reduces operational costs and greenhouse gas emissions. The drive to reduce energy consumption also demonstrates the organization's concern for natural resources and the environment. ISO 50001 is an energy management standard designed to control energy costs and reduce greenhouse gas emissions. The energy management standard provides structured and comprehensive methods for improving energy efficiency. The standard provides requirements for the design, implementation, maintenance and improvement of a management system to continuously monitor and reduce energy consumption.

ISO 50001 - the standard for improving energy efficiency

- The working principle of ISO 50001:

- Defines an organization's energy management policy to achieve greater energy efficiency

- Establishes energy saving targets and measures to achieve the targets

- Analyzing energy consumption data to make appropriate decisions

- Measuring results

- Assess the performance of the energy management system

- Continuous improvement of the adapted energy management system

ISO 50001 - the standard for improving energy efficiency

- The ISO 50001 energy management standard is aimed at all organizations, but the greatest benefits will accrue to organizations with high energy consumption, such as industrial companies, energy producers, water suppliers, waste recyclers, property managers, hospitals and shopping centers.

ISO 50001 - the standard for improving energy efficiency

- **Benefits of ISO 50001 for your organization**
- An energy management system offers the following opportunities:

1. Identify and manage risks associated with future energy consumption
2. Monitor and measure energy consumption to identify potential energy saving opportunities
3. Improve overall operational efficiency by reducing energy bills
4. Reduce greenhouse gas emissions to contribute to national greenhouse gas reduction targets
5. Declaring energy efficiency and environmental protection increases the chances of securing more business
6. Energy security is enhanced
7. Motivates employees to save energy

ISO 50001 - the standard for improving energy efficiency

- ISO 50001 is easily compatible with other management standards such as ISO 9001 for quality management and ISO 14001 for environmental management.

SA 8000 social responsibility standard

- **Objectives of the SA 8000 social responsibility standard**
- To ensure the social well-being of employees and civil servants;
- To improve conditions not only within the company but also to encourage subcontractors;
- Demonstrate to Western partners that the organization treats its employees in a civilized manner and has implemented key provisions and directives of the Human Rights Convention.

SA 8000 social responsibility standard

- **SA 8000 requirements:**
- Child labor must not be used (only allowed with certain exceptions and conditions).There shall be no (direct or indirect) forced labor, corporal punishment or abuse.
- Health and safety at work.
- Workers would be able to set up trade unions and associations and have the right to collective bargaining.
- There would be no discrimination on grounds of race, caste, origin, religion, disability, gender, sexual orientation, membership of organizations, political opinion or age in hiring, remuneration, training, promotion, dismissal or retirement,
- Working hours, overtime, working on holidays and weekends would be clearly defined.
- A clear remuneration system and bonuses for the employee.
- Encouraging subcontractors to implement all the above requirements.

SA 8000 social responsibility standard

- **Benefits of SA 8000 for the organization**

- Helps realize the organization's social values

- Enhances the organization's reputation and value to society and investors

- Provides opportunities to find better employees, retain them and increase productivity

- Helps to better manage social risks in the supply chain

- Reduces business risks due to a favorable social climate in the organization

- Makes it easier for potential customers to choose companies that comply with current ethical labor practices and legislation.

SA 8000 social responsibility standard

SA 8000 is easily compatible with other management standards such as ISO 9001 for quality management, ISO 14001 for environmental management and OHSAS 18001 for occupational safety and health management.

BS OHSAS 18001 is the family standard for occupational safety and health management

BS OHSAS 18001 is a family standard for occupational health and safety management issued by the British Standards Institution. The implementation of OHSAS (Occupational Health and Safety Management Systems) demonstrates an organization's responsible approach to occupational safety. Occupational health and safety management systems are mandatory in many countries. The organization must assess the safety and health risks associated with its activities, understand how to manage these risks and set clear objectives to continuously improve the effectiveness of the system. The standard helps organizations to control hazards in normal work processes and to avoid crisis situations.

BS OHSAS 18001 is the family standard for occupational safety and health management

- **The OHSAS 18001 standard has 3 components**
- Hazard identification
- Analyses conditions and situations in which workers may become injured or ill.
- Risk assessment
- Assesses the risks arising from potential hazards and analyses the effects of combinations of hazards.
- Risk control
- Potential risks are controlled in order to keep the risk at an acceptable level.

BS OHSAS 18001 is the family standard for occupational safety and health management

- **Benefits of OHSAS 18001 for the organization**

- **Compliance with legal requirements**

- An organization with an occupational health and safety management system in place shall fully comply with legal requirements in the field of occupational safety.

BS OHSAS 18001 is the family standard for occupational safety and health management

- A structured approach to managing occupational safety and health risks is developed

- Risks are continuously measured and monitored.

- Improved organizational culture

- The introduction of a risk framework makes employees more concerned about preventing threats and risks.

- Increased attractiveness of the employer

- An organization with a commitment to occupational safety and health becomes more attractive to potential employees.

BS OHSAS 18001 is the family standard for occupational safety and health management

OHSAS 18001 is easily compatible with other management standards such as ISO 9001 for quality management and ISO 14001 for environmental management.

ISO 9001 quality management system family standard

- **ISO 9001 sets requirements in the following areas**

1. Communicating with the customer and meeting their needs;

2. Clearly defining the level of duties, responsibilities and controls within the company;

3. Selection and training of qualified personnel to communicate all quality management requirements and to meet the customer's exact requirements;

4. Utilizing, calibrating and maintaining the correct equipment for the production of customer orders. Acquisition and maintenance of necessary measuring instruments;

5. Measures for suppliers to avoid low-quality raw materials and supply interruptions;

6. Design requirements: the initial information obtained from the customer must be consistent with the design data obtained;

7. Requirements for control and analysis of production and the quality system itself;

8. Requirements for the documentation of the management system to be developed.

ISO 9001 quality management system family standard

ISO 9001 defines the requirements of a quality system, or the activities related to it, in general terms only. It may seem that the introduction of this standard creates a lot of unnecessary paperwork for the company to read and fill in. However, all the new documents formalize the activities already taking place in the company. They help each employee to work and communicate according to agreed working methods, specifying their areas of activity and responsibilities.

ISO 9001 quality management system family standard

The quality management system and the ISO 9001 standard, which helps to implement it in the company, ensure the quality, accuracy and sustainability of the work of the entire company, guarantee the transparency and clarity of all the processes that take place in the company, accurately divide the responsibilities among the employees, and promote the continuous improvement of the company's performance, cost reduction, sales growth and profit growth.

ISO 9001 quality management system family standard

- **Benefits of a quality management system for your organization**

- Quality management is the formula for an organization's success in an increasingly competitive global market. Customers are increasingly demanding specific characteristics and exceptional quality products. More than 1 million organizations in 178 countries have adopted the ISO 9001 quality management standard. ISO 9001 is an internationally known and recognized standard issued by the International Organization for Standardization (ISO). In Lithuania, more than 1800 companies have adopted ISO 9001.

ISO 9001 quality management system family standard

- Your organization will benefit from ISO 9001 because:
- optimizing the company's structure, roles and responsibilities, and defining more specifically the division of labor and responsibilities;
- improving business processes and work organization;
- elimination of overlapping or non-value-added processes;
- the organization becomes a coherent system whose effectively managed processes lead to quality products;
- employees at all levels are aware of their contribution to quality assurance and their role in the organization by clearly defining the authority of each employee;
- it can enhance employee motivation and loyalty;

ISO 9001 quality management system family standard

- Improves internal discipline, processes and the interaction between employees;

- processes become more targeted, measurable and evaluated;

- fewer mistakes are made;

- reducing waste of resources;

- managers spend less time on problem solving;

- more time is available for unbiased assessment, analysis and definition of improvement guidelines, improving the effectiveness of corrective actions and the ability to analyze performance;

- all of which leads to cost reductions, increased productivity, improved management and control and better working conditions.

Have a nice evening ☺

Erlandas

Topic:

"LEAN"

Author
Erlandas Lazauskas

LEAN

Lektorius E.Lazauskas

LEAN

- Lean is a methodology for improving the performance of organizations.

- The term Lean originated in the USA around 1990, when it was first used by J. Womack and D. Jones in their book "Machine That Changed the World".

LEAN

- Using LEAN, operational costs are reduced by 10-25% and productivity is increased by 25-55%. In LEAN practice, indicators such as operating costs, labor productivity, quality, lead times and other indicators are often improved by double-digit percentages for many consecutive years. Long-term process improvement activities using LEAN methods allow companies to achieve greater efficiency and quality. Despite a successful start, only 30% of companies succeed in making LEAN part of their organizational culture.

LEAN

Every organization has a number of internal processes through which it creates value for customers. All organizations also have a management system and practices in place to manage these value creation processes.

LEAN

The reality is that in many cases both the processes and the management system are not efficient enough. Lean allows you to significantly improve their performance without significant investment.

LEAN

Technically, Lean consists of a set of principles, solutions and tools focused on the continuous improvement of value creation processes and their management system. They take organizations several years to put into practice, but the improvement itself is continuous. "Kaizen is infinite" say Japanese Lean experts.

LEAN

Taiichi Ohno, the founder of Lean, identified common sources of internal waste in organizations around 7 decades ago.

LEAN

Overproduction. Products, parts, services that we have produced in higher volumes or earlier than the consumer has demanded.

Waiting. Downtime of equipment, people, process - during which we do not create value but often incur costs.

LEAN

Transportation. Transportation of materials or work equipment along irrational routes. A more complex, longer than necessary route for the transmission of documents or electronic information.

LEAN

Additional processing. When performing various tasks and jobs, we often do more than the minimum necessary. We sort and re-sort details and information. We check and recheck things that should have been done well the first time or redo work that was not done well.

LEAN

Stocks. A stock of materials or information that is greater than is necessary to perform a specific job. in manufacturing, materials, work in progress or complete products. also, there may be excessive amounts of documents or electronic information in the office environment (workstations, computers, storage).

LEAN

Movements. When we look closely at people who work, we often notice that they do all sorts of irrational things. In physical work, these are long amplitude, awkward, complex movements. When working on a computer, people also often perform actions of questionable necessity: complex information searches, repetitive data entry into different systems, etc.

LEAN

Defects. Products, parts or services that do not meet the consumer's requirements or expectations. The consequences of poor quality are typically much greater than they may appear at first sight. It is not just about damaged materials or re-work. It is not just the time lost in finding a solution to a quality problem, the cost of time spent by quality supervisors and managers, or the damage to the organisation's reputation.

LEAN

The systematic elimination of these losses has been going on for many years. Specific Lean solutions and methods significantly accelerate improvement - like the application of a "cookbook". We don't need to create a new improvement, but simply select from a "menu" of Lean solutions and adapt them to the specific situation.

LEAN

Management's short-termism has led to insufficient efforts to transform the organization's culture and management system. Managers do not change their leadership style: they do not understand their role and responsibility in a LEAN company and do not become real coaches of their employees. A small number of employees are involved in the change process. In a company with a more complex structure, some departments are only formally involved in LEAN activities. As priorities, employees, products and services change, some of the improvements made in the past are not sustained. The company's partners are not involved in LEAN implementation activities.

LEAN

The first principle is referred to as 'loss elimination'. There may be times in the production process when a significant amount of resources are used to produce a product, but the use of these resources does not pay off and does not provide any benefit. Lean allows to avoid unnecessary losses and to focus on profits.

LEAN

The second principle is value assurance. Production processes use certain techniques to give value to a product. However, in any case, value is determined by the customers themselves, for whom it is important to obtain a quality product at a good price. It should be stressed that a good price is not a low price, but a price that reflects the quality of the product.

LEAN

The third principle is change. Change in corporate governance must be initiated by managers themselves. Only when the philosophy of the Lean system is well understood and ready to be implemented can managers give instructions to employees. It must be stressed that such changes must be radical. In addition, it is compulsory for the company's employees to receive Lean training.

LEAN

The fourth principle is the implementation of Kaizen. This means that a group of employees must be created to take care of the implementation of the Lean system in the company.

LEAN

The effectiveness of a Lean implementation depends on the extent to which the principles of Lean are followed. These principles are the core values that must be adhered to in order to ensure the effectiveness of Lean in the management of a company.

LEAN

Have a great weekend!

Topic:

"LEAN Production"

Author
Randi Sepping

LEAN production

Randi Sepping
Project „Skilled Up" wood processors development program training
"Work organization in a wood company"
09.01.2020

Three key aspects for the customer

Quality

Speed

Price

How to achieve this?

How do we get the price down? Good quality, speed up?

Increasing inventory - increases costs (material, labor, goods with a shelf life, etc.)

Innovative machines (want finance)

Mass work (requires corresponding production)

What if I can't produce like that?

Why couldn't Japan produce as much as the United States?

- There was no production space
- Shortage of raw materials
- Expensive transport
- After the war, the financial crisis and the car industry were not important for banks
- There were no immigrants in Japan who would do cheap work

Toyota example (Toyota Production System)

Taiichi Ohno

The goal is to catch the US in 3 years.

What is the result of a shorter format?

- Smaller quantities

- Less stock

- Faster assembly

- Errors come out faster

- Better quality

What else was he trying to do?

The teams together with the leader were responsible for the work cycle for the Estonian employee

Thus, the workers were also involved in the process

Basic things at production!

Subcontracting and sharing of experience

Taiichi Ohno

We focus on the whole cycle: from receipt of the order to invoicing. We eliminate waste from this period and reduce the time between receiving an order and submitting an invoice.

Three main aspects of inefficiency

3M

MURA- variation

MURI- overload

MUDA- nonsense, redundancy, waste (companies focus mainly on this)

What is a waste?

Waste is an activity that consumes resources but adds no value from the customer's perspective.

7+1 waste

The 8 Wastes of Lean Manufacturing

Transport · Inventory · Motion · Waiting · Over-Production · Over-Processing · Defects · Unutilized Talent

Overproduction

More is produced than can be sold - why?

- Keep machines / people working

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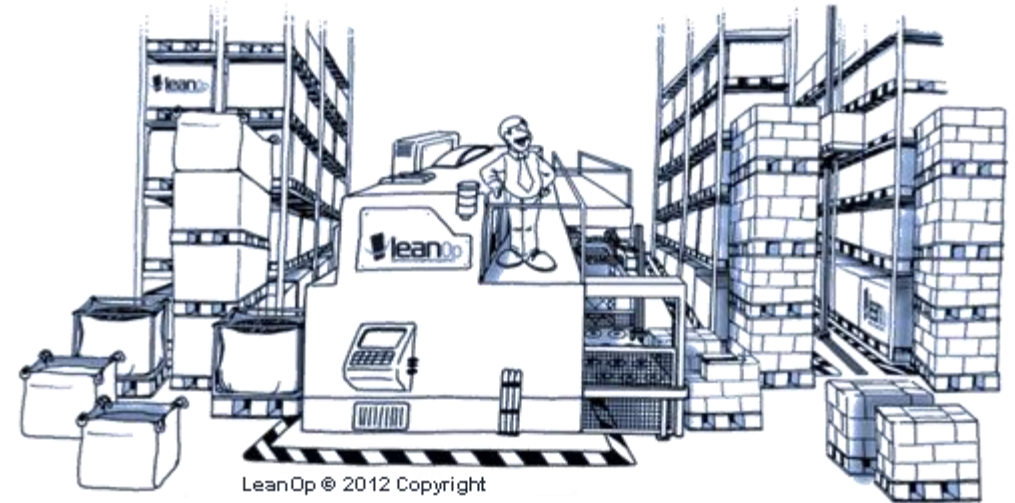
Transport

Building construction machines, work areas, departments, etc.

- Sequence and frequency of transport
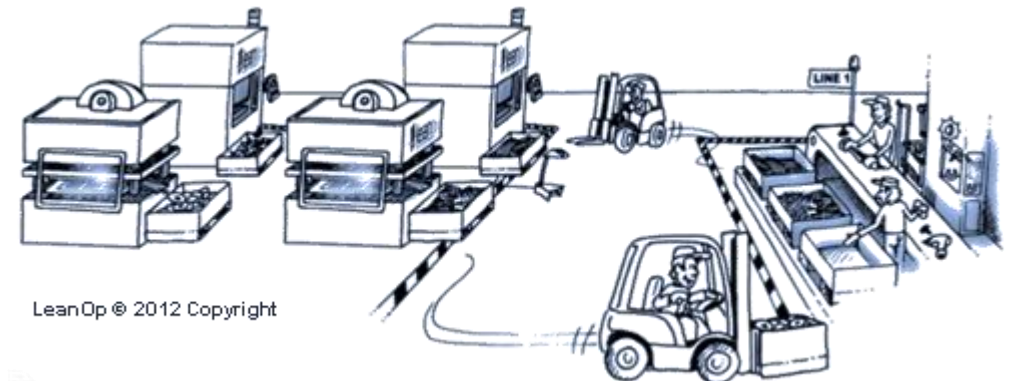
Inventory

They fall into four categories

MONEY THAT'S STUCK SOMEWHERE

Raw materials - necessary for production

Number of jobs in the system - all unfinished jobs

Finished goods - products that have not been sold

Spare parts - for repair, maintenance, etc.
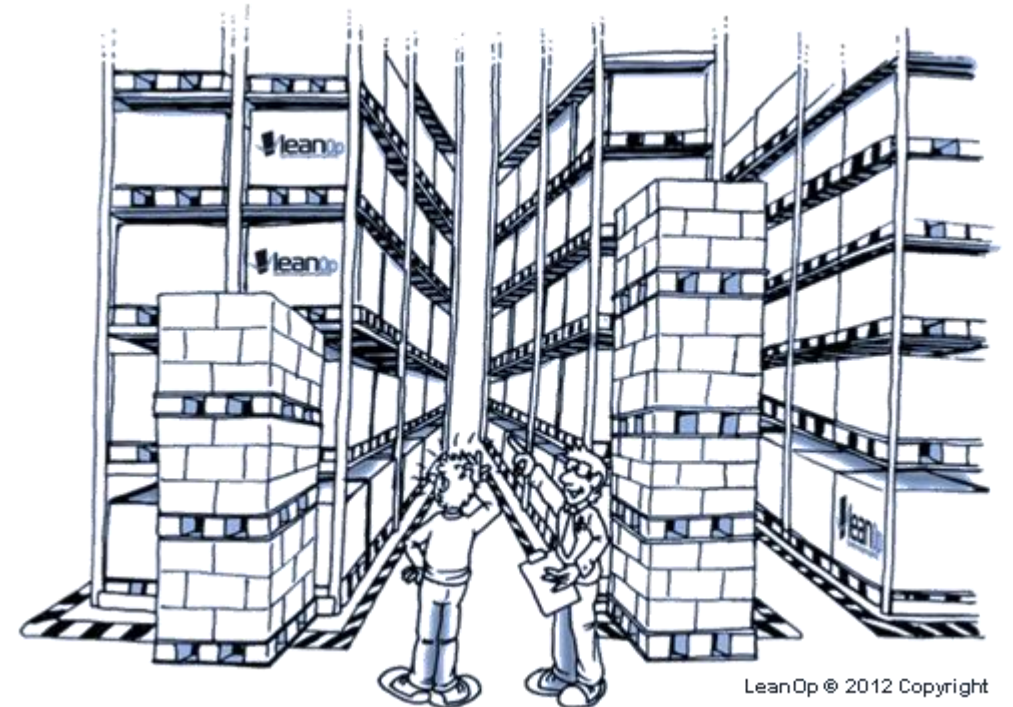
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4 typical situations why stocks are held

Inventories are intended to cover fluctuations in customer demand

To ensure uninterrupted production flow in the event of a machine failure.

Replace defective materials or defective products

Larger production batches to avoid product exchanges

Possible additional benefits for small batches

Easier to follow

Less production space

No work in tight spaces

Large stocks need more people

Defects

Defects - the biggest source of waste

NEVER SEND AN ERROR DETAIL

Poka-joke
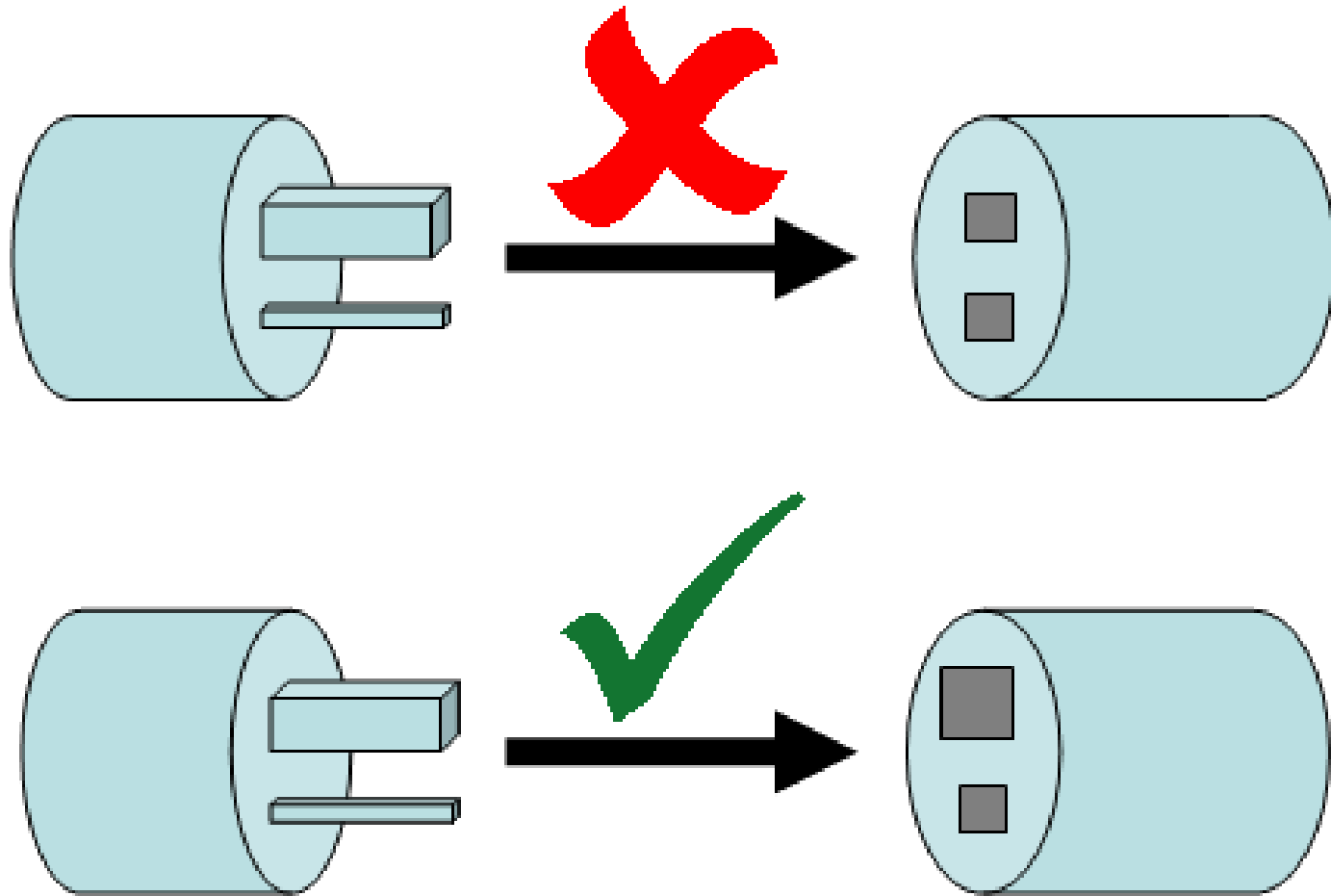
Poka-Yoke Examples

Shutdown (Prevention): Newer mowers are required to have a safety bar on the handle that must be pulled back in order to start the engine. If you let go of the safety bar, the mower blade stops in 3 seconds or less.

Waiting

The main culprits

High system load

Variation
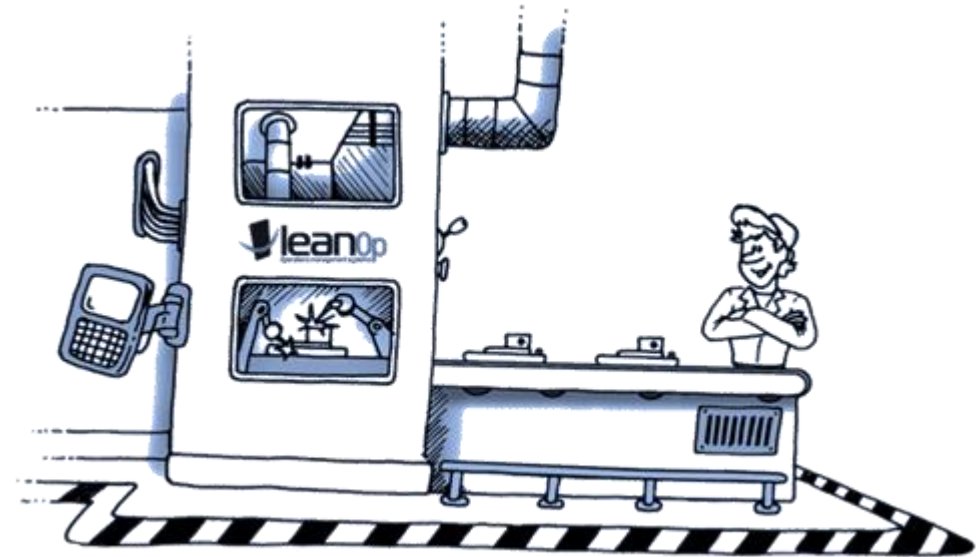
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Motion

According to Lean, work is a type of movement that adds value to a product or needs to be done for a previous purpose.

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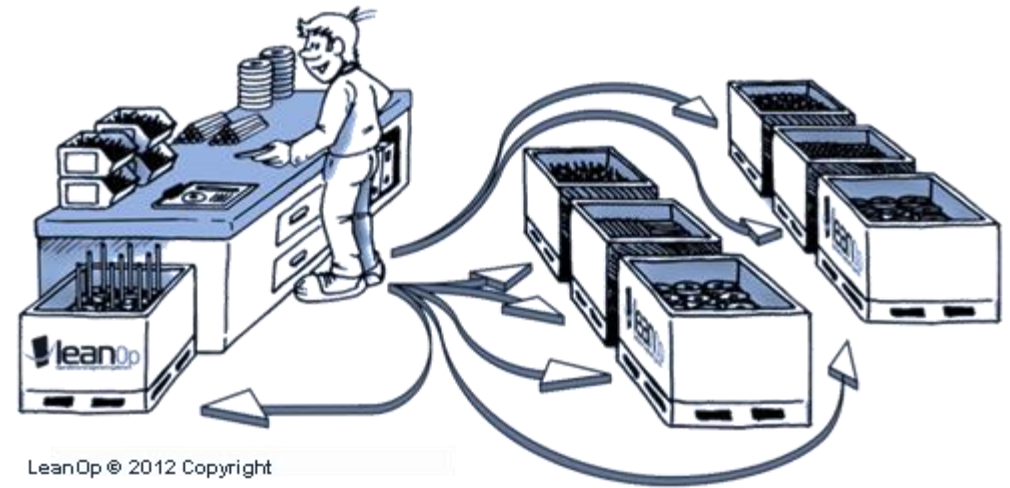
For example, a work operation takes 12 minutes, but a worker takes 20 minutes

Workload = useful work / total work

Volume of work = 12/20 = 60%

The most common waste of movements

- Search
- Choice
- Bring with you
- Transport
- Charging
- Relocation
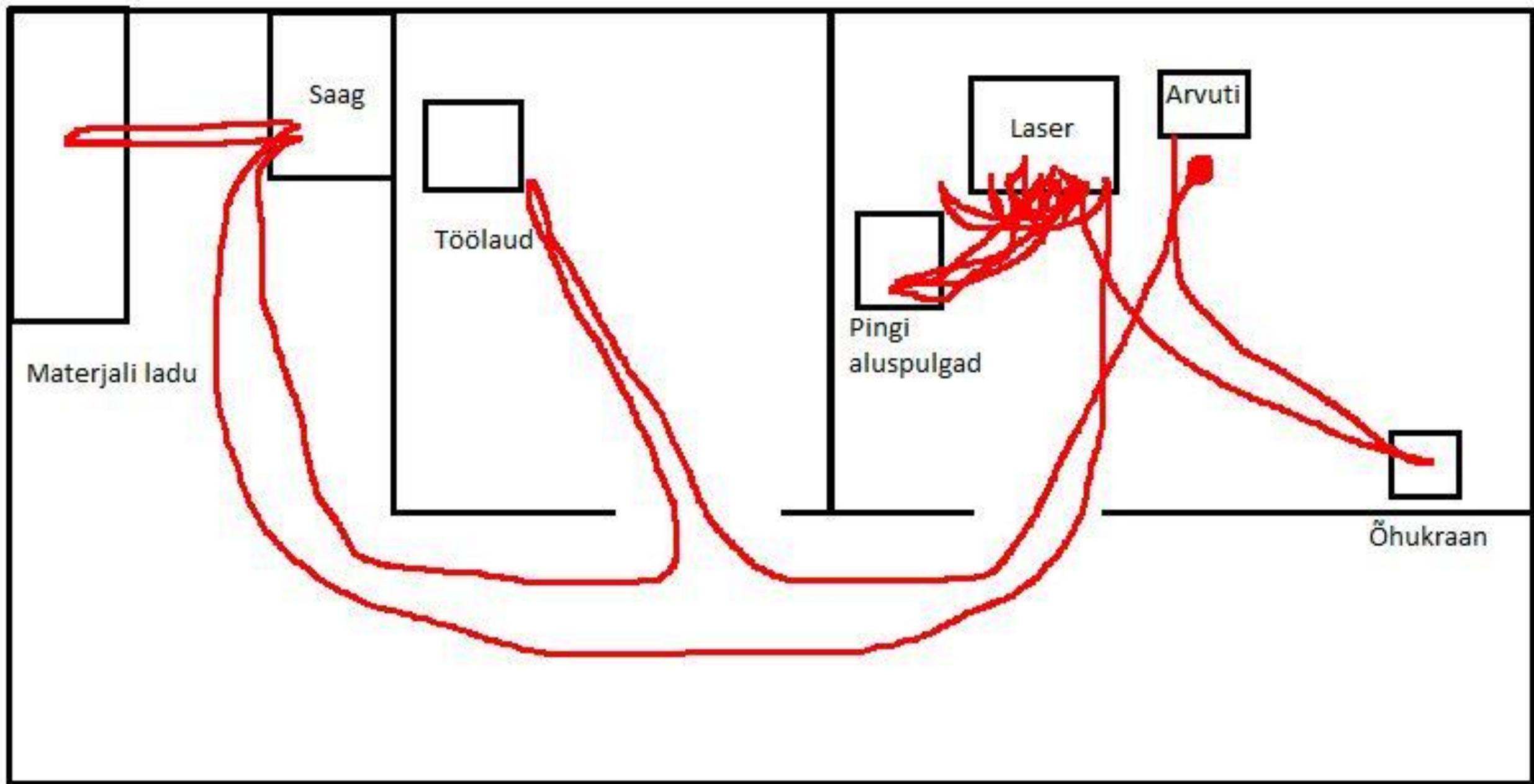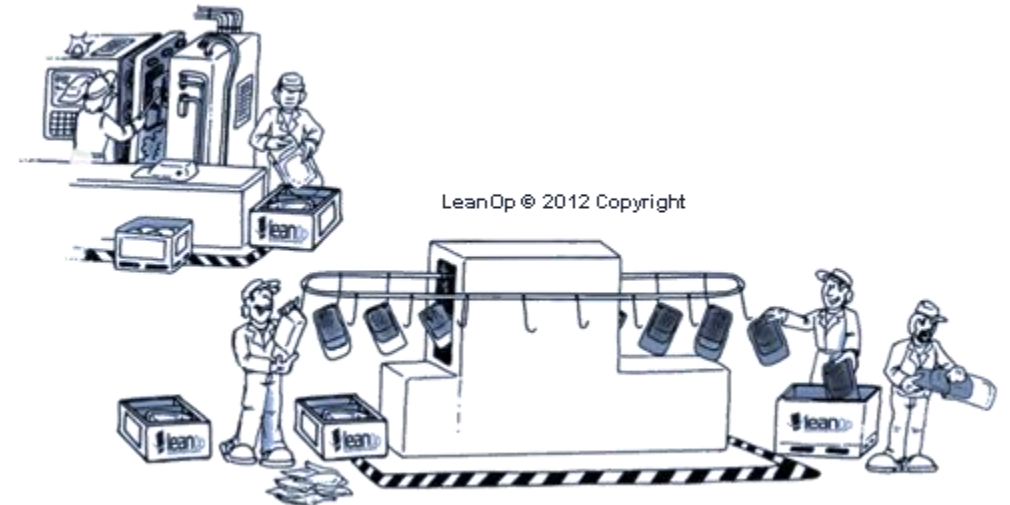- Unloading

How to understand what a waste of movement is?

Spagetti map
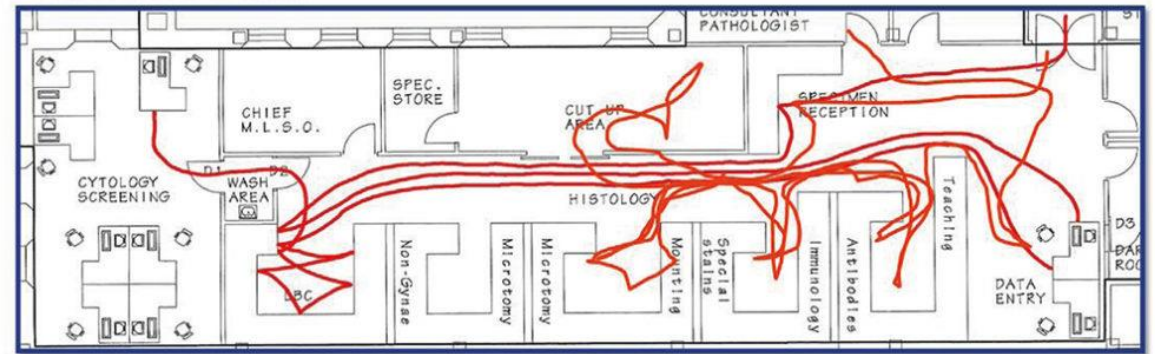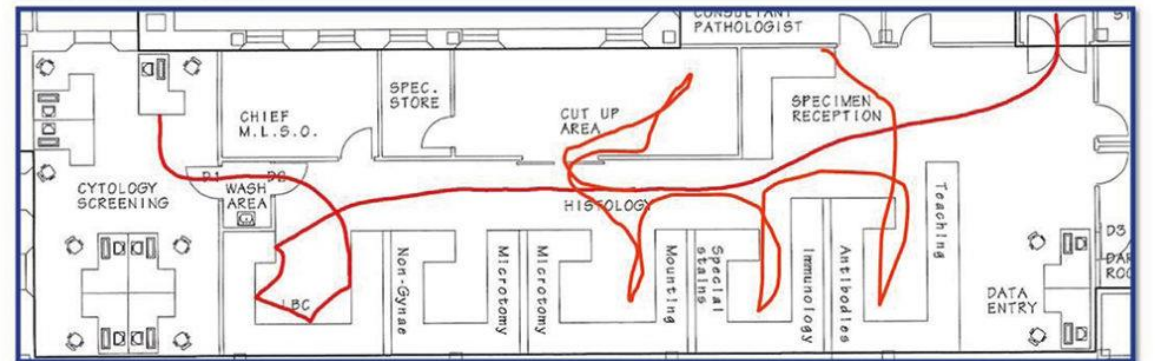
Spaghetti map of a laboratory before and after Lean

Overprocessing

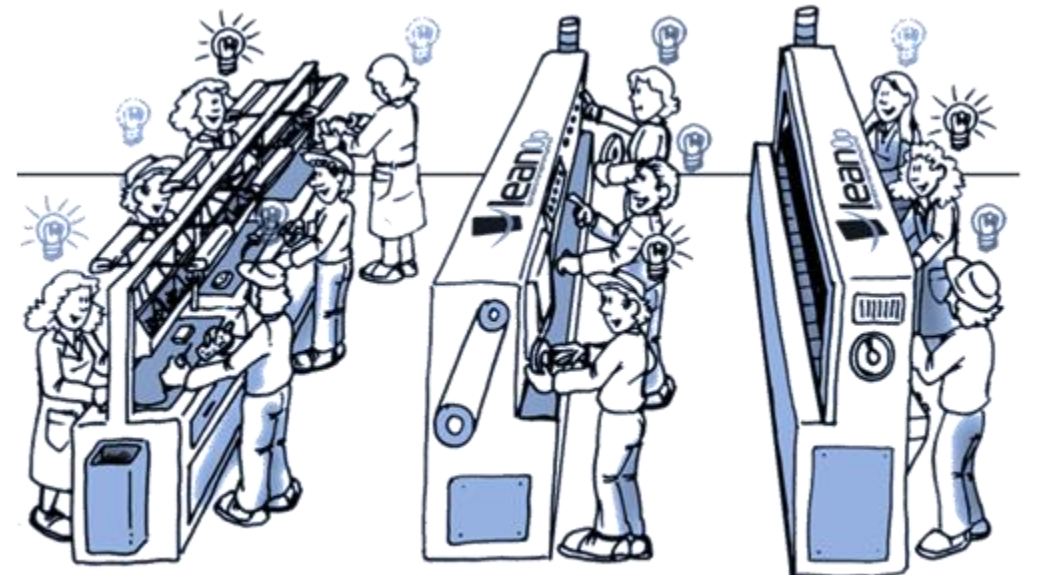Excessive quality control

Continuous packaging of parts

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Unutilized employee creativity and intelligence

Added around 1990

Workers' ideas are not used

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