

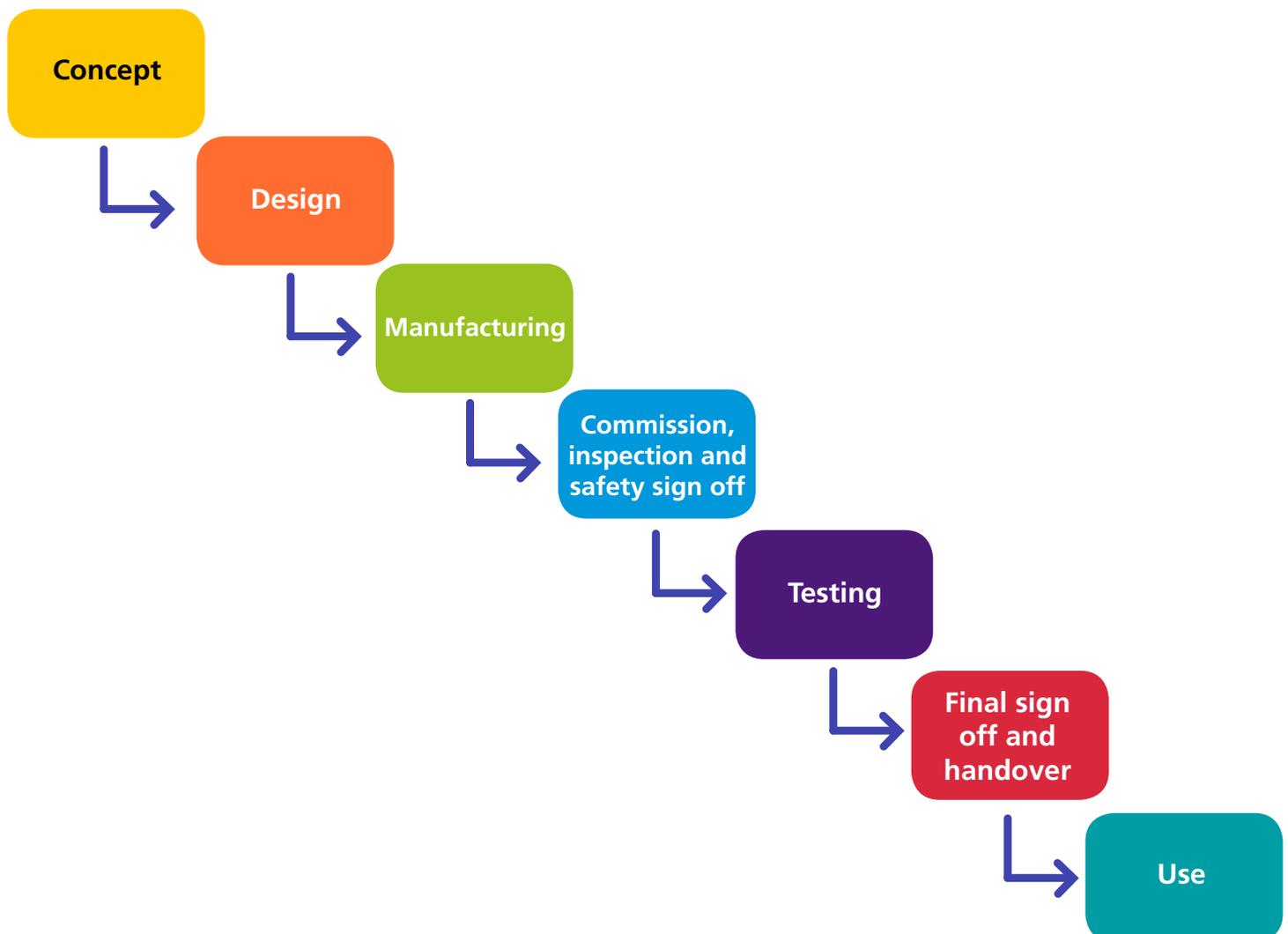
Guidance for the entertainment industry – machinery safety (gems)

A safe principles guide for the design, manufacture and use of machinery intended for use as part of a theatrical set

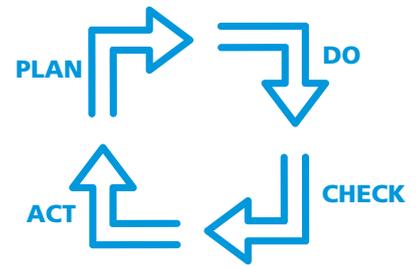
(Version 1.4. January 2019)

This guide has been produced for theatre industry workers that are involved in the design, manufacture and use of machinery as part of theatrical sets and scenery. It is suitable for Technical Managers, Technical Designers, Draughtspersons, Construction Managers, Production Managers, Stage Managers and Producers. The guidance takes a step-by-step checklist approach through each stage of theatrical set design and manufacture - from concept, to sign off and use. It guides you through best practice and principles of good health and safety risk management as applied to the design and manufacture of machinery used as part of theatrical sets, to ensure that it is fit for purpose and safe for use.

This document does not replace regulations, directives, approved codes of practices or standards but can be followed alongside them.



Concept



Purpose:

- To receive and interpret a set design concept from the creative teams and to start to identify any potential hazards that may come out of the realisation of the design. (A Machinery Health and Safety Checklist could be used to assist with this).
- To start thinking about how to eliminate these hazards through design.
- To create a risk assessment document for the design and update accordingly.
- To consider if you will need any additional competent mechanical, structural or electrical engineering advice.

Definitions:

Competent Engineering Advisor: Someone with suitable skills, training, knowledge and experience. You should look for engineers who hold recognised engineering qualifications and accreditation, for example, a chartership held with a national or international engineering body.

Checklist

When identifying hazards within the design concept consider if there are any...?

- Controlled or uncontrolled moving parts?
- Traps?
- Platforms or treads?
- Hazardous substances?
- Electrical or other energy sources?
- Hazardous surfaces?
- Load restrictions?
- Force restrictions?

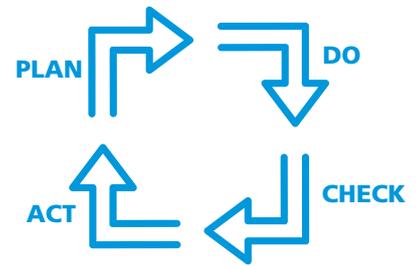
Have you considered...?

- Safe access and egress?
- Good ergonomic design for users and controls?
- Safe access to machinery and parts for maintenance, cleaning and repairs?
- Suitable operator sightlines?
- Warning devices?
- 'Fail to safe' redundancies in the event of power failure?
- Any reasonably foreseeable risk of misuse?

Links to template documents

- Risk Assessment Template
- Machinery Health and Safety Checklist

Design



Purpose:

- To continue identifying potential hazards within the set design, to eliminate them through design where reasonably practicable, and to continue to update your risk assessment documents accordingly.
- To establish if and what new machinery you will be manufacturing as part of the set build.
- To establish if you are building an assembly of machines and if so, which sections of machinery will be built as new or modified from existing.
- To establish if the machinery will be manufactured in-house or by an external contractor.
- To consider what legislation applies to your machinery. For example, in the EU and UK, machinery that is intended to move items or persons other than performers must comply with the Machinery Directive 2006/42/EC and The Supply of Machinery (Safety) Regulations, 2008.
- To consider what British Standards, European Standards and / or International Standards apply to the design, manufacture, commissioning and maintenance of machinery. A competent engineering specialist can assist you in determining which standards you will need to apply.
- To begin drafting your Engineering Design Specification to include the performance scope and restrictions of the machinery, and its functional characteristics.
- To start the process of putting together a Technical File for each machine. You can use the Technical File Contents List Template as a guide as to what should be included in the file.

Definitions:

Machinery: "An assembly, fitted with, or intended to be fitted with, a drive system other than directly applied human effort, consisting of linked components, at least one of which moves, and are joined together for a specific application" (taken from the 'Supply of Machinery (Safety)' Regulations, 2008). A load that is put into or onto a machine for positioning or transportation is not part of the machine. For example, a piece of scenery that is placed onto a revolve for re-positioning as part of a scene change is not part of the revolve machinery.

Technical File: A file consisting of documents that includes information about the design, manufacture and operation of a machine or assembly of machines. In some countries this file is required by law for machinery that is intended to move items or persons other than performers.

Competent Engineering Advisor: Someone with suitable skills, training, knowledge and experience. You should look for engineers who hold recognised engineering qualifications and accreditation, for example, a chartered membership held with a national or international engineering body.

Checklist

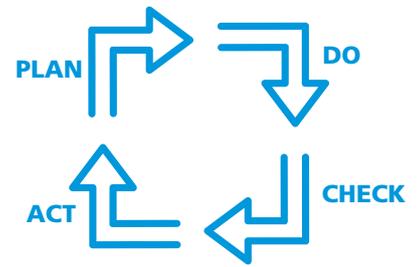
Have you...?

- Confirmed what machinery you are going to be manufacturing?
- Confirmed if the machinery is made up of an assembly of other smaller machinery?
- Determined what regulations, international and national standards apply to your machinery and obtained competent engineering advice as required?
- Decided who will be manufacturing your machinery?
- Completed your Engineering Design Specification?
- Eliminated by design as many hazards as possible?
- Where not possible to eliminate hazards through design, have you provided technical protection against these hazards?

Links to template documents

- Technical File Contents List Template
- Machinery Health & Safety Checklist
- Risk Assessment Template

Manufacturing



Purpose:

- To collect all safety information on materials, systems and methods of building the machinery.
- To produce technical drawings for the machinery.
- To continue to risk assess the hazards associated with the manufacture, construction, maintenance and cleaning of the machinery; and continue to update your risk assessment documents accordingly.
- To build the machinery safely and in accordance with the design.
- To continue to update the technical file.

Remember

If the manufacture of the machinery has been contracted to another company other than your own, you are responsible for ensuring that your contractor fulfils their legislative duties relating to your machinery.

Definitions:

Declaration of Conformity: A document, legally required for some machinery used in the EU and UK, declaring that the machinery conforms to legally required standards.

Declaration of Incorporation: A document, legally required for some incomplete machinery supplied in the EU and UK, declaring that the machinery is incomplete, and the supplier cannot take responsibility for producing a Declaration of Conformity or CE Marking for it.

CE Marking: A marking of the letters CE on an item, such as a machine, to state that the item complies with all legally required standards and has been issued with a Declaration of Conformity.

Checklist

Have you...?

- Collected manufacturing instructions and information regarding machinery or other items that will be used as part of the assembly of the new machinery and incorporated them into your technical drawings, risk assessments and technical file?
- Collated Declarations of Conformity or Declarations of Incorporation from suppliers of machinery or other parts that will be used as part of the assembly of the new machinery, where required by law?

Can you include the following documents in your technical file...?

- Drawings and photographs of machinery or parts of machinery?
- A description of the machinery?
- An Engineering Design Specification for your machinery?
- Risk assessments and method statements for the erection and dismantling of machinery?
- Details of findings from any tests carried out on your machinery or parts of machinery?
- Risk assessments and safety information regarding hazardous substances contained or used within your machinery?
- Risk assessments for the use, maintenance and cleaning of the machinery?

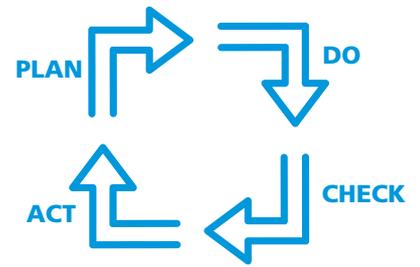
Does your machinery risk assessment and instructions for use consider...?

- Transportation and installation?
- Moving parts and guarding?
- Means of access, discomfort, fatigue or stress for users?
- Power supply and isolation?
- Hardware or software faults?
- Trapping or crushing?
- Forces and stresses?
- Noise and/ or vibration?
- Fire and/ or explosion?
- Hazardous surfaces?
- Hazardous substances?
- Manual handling?
- Additional hazards associated with the commissioning and testing of the machinery?

Links to template documents

- [Technical File Contents List](#)
- [Machinery Health & Safety Checklist](#)
- [Risk Assessment Template](#)

Commissioning, inspection and safety sign off



Purpose:

- To check that the machinery does what it is designed to do.
- To verify and confirm that the machinery is safe for use.
- To provide information, instruction and training for the safe use, inspection, maintenance and cleaning of the machinery.

Definitions:

Competent person: a person with sufficient training, knowledge, skills and experience to carry out a particular task. Depending of what type of machinery is being inspected and commissioned, there may be legal requirements in relation to the level of competency required to carry out those tasks that you will need to comply with.

Checklist

Have you...?

- Carried out a risk assessment of the commissioning phase?
- Used competent persons to carry out inspections of the machinery and verify that it has been built according to the design, is safe for testing, use and/ or commissioning?
- Used competent persons to carry out the commissioning of the machinery?
- Checked and evidenced the competency of persons carrying out inspections and the commissioning of your machinery?
- Used independent or impartial competent persons to carry out thorough inspections of any lifting equipment and accessories?
- Referred to relevant Regulations, British Standards, European Standards and / or International Standards that apply to the commissioning of the machinery?

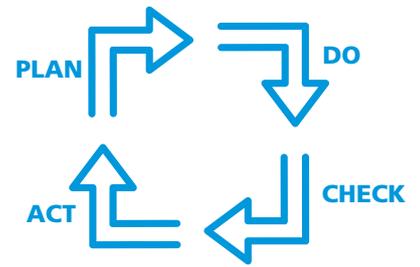
Can you include the following documents in your technical file...?

- Inspection reports?
- Test certificates?
- Commissioning reports?
- Safety sign off documentation?
- Instructions for the safe use, cleaning, inspection and maintenance of the machinery?

Links to template documents

- [Technical File Contents List](#)
- [Risk Assessment Template](#)

Testing



Purpose:

- To check that the machinery does what it is intended to do.
- To snag, redesign and rebuild, as required through technical rehearsals and previews.
- To check that the users of the machinery have been provided with suitable and sufficient training, instruction and information on how to safely operate, maintain and check the machinery.

Definitions:

Testing Period: The period of time where scheduled rehearsals and performances take place on the set, and with the use of the new machinery, where changes to the required use and design of the machinery can be modified as required.

Checklist

Have you...?

- Carried out a risk assessment for the testing period?
- Carried out a review and amendment of any risk assessments and safe systems of work relating to use, maintenance and cleaning of the machinery that may be required following any re-design or modification?
- Updated the Technical File with modifications to design, drawings, photographs, user instructions, risk assessments or method statements?
- Kept a record of all training carried out on the safe use of your machinery?

Can you include the following documents in your technical file...?

- Testing period risk assessment?
- Inspection reports?
- Test certificates?
- Amended machinery risk assessment, method statements and instructions for use?

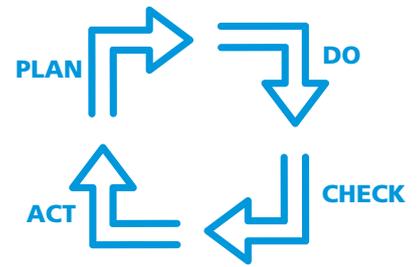
REMEMBER

Any subsequent additions or modifications to machinery after testing will result a new cycle of **commissioning and safety sign off → testing**

Links to template documents

- [Technical File Contents List](#)
- [Risk Assessment Template](#)

Final sign off and handover



Purpose:

- To sign off the machinery as safe for use and fit for its intended use, checking that all risk control measures are in place in accordance with the machinery risk assessment.
- To handover the machinery from the design and build teams to technical and stage teams.
- To check that any additional training requirements are met.
- Where required by law, complete and sign a Declaration of Conformity and mark the machinery with an appropriate CE mark.

Definitions:

Declaration of Conformity: A document, legally required for some machinery used in the EU and UK, declaring that the machinery conforms to legally required standards.

CE Marking: A marking of the letters CE on an item, such as a machine, to state that the item complies with all legally required standards and has been issued with a Declaration of Conformity.

Notified Body: Independent organisations appointed and accredited by the state to undertake conformity assessments on behalf of the person or Company responsible for certain types machinery.

Checklist

Have you...?

- Completed a Machinery Health & Safety Checklist?
- Formally signed off the machinery as safe for use, checking that all risk control measures are in place in accordance with the machinery risk assessment?
- Provided the new owner of the machinery with clear instructions for use in a language that they understand?
- Provided the new owner with a schedule, checklist and any tools required for cleaning, maintenance and inspection of the machinery?

Where the machinery is in use in the EU and UK only AND is not intended to move performers, have you also...?

- Handed your completed Technical File to the new owner of the machinery?
- Completed a conformity assessment? You can use the Machinery Health & Safety Checklist for this task. For some types of machinery, the conformity assessment will need to be completed by a third party 'notified body'.
- Signed a Declaration of Conformity? For some types of machinery this will need to be completed by a third party 'notified body'.
- Marked the machinery with a CE mark? For some types of machinery this will need to be completed by a third party 'notified body'.

REMEMBER

Any subsequent additions or modifications to machinery after final sign-off will result a new cycle of

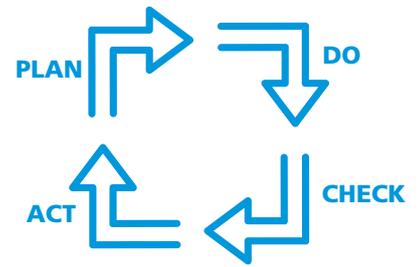
Commissioning and safety sign off → Testing → Final sign off & handover

If additions or modifications are significant enough to have altered the machinery functions; functionality of safety devices; or introduced new hazards, a new Declaration of Conformity should be signed and a new CE mark attached, as legally required.

Links to template documents

- Technical File Contents List Template
- Machinery Health & Safety Checklist
- Declaration of Conformity

Use



Purpose:

- To ensure that the machinery is regularly cleaned, maintained and inspected by persons who have been given instruction, information and training to carry this out safely.
- To provide a user guide for safe use of the machinery. You can use the End User Guide Contents Checklist template as a guide as to what should be included.
- To keep cleaning, maintenance and inspection logs up to date.
- To report any defects or concerns with the machinery.
- To safely dispose of the machinery after its use.

Checklist

Have you...?

- Provided the new owner / user of the machinery with instructions for use, including what to do if things go wrong?
- Provided the new owner / user with a schedule and checklist for cleaning, maintenance and inspection of the machinery?
- Provided the new owner / user with additional information, tools and resources for the repair of the machinery, as needed?
- Provided the new owner / user a cleaning, maintenance and inspection log, and also stored it within the Technical File?
- Provided the new owner / user with instructions for the safe decommissioning, dismantling and disposal of the machinery as per your risk assessment, method statements and legal requirements?
- Ensured that the Technical File can be stored for the required period? Technical Files held for machinery as required by EU and UK legislation AND is not intended to move performers must be kept for a minimum of ten years.

REMEMBER

Any subsequent additions or modifications to machinery after final sign-off will result in a new cycle of

Commissioning and safety sign off → Testing → Final sign off & handover

Links to template documents

- [Technical File Contents List Template](#)
- [End User Guide Contents Checklist](#)