

Health and Safety/Patents/Symbols



What is Health and Safety?

A series of procedures and regulations put in place in workshops and industry to ensure the safety of workers and the general environment of the facility. This involves controls over hazardous substances, machines and equipment.

Risk Assessments are done in industry to control a production process and ensure there are measures put in place to keep encourage safe working and to have plans in place if anything does go wrong.

Signage is used to help notify and warn people of hazardous equipment, substances or areas, and can also serve as a reminder to wear PPE. (Personal Protective Equipment)

COSHH Regulations

Most manufacturing plants use substances, or products that are mixtures of substances. Some processes create substances. These substances are identified and monitored.

COSHH Regulations are a good example of how to apply Health and Safety.

TIP: Think of hazardous substances in DT!

Health and Safety Symbols




Can you name any items of PPE? You should know a range for the exam, and what it might be used on.

Patents and Trademarks


What is a patent? A patent protects a person or company that invents something new. This should prevent anyone or another company from stealing your idea, manufacturing it and making money for themselves. Patents only apply to individual countries, such as the UK and US.

Trademarks A trademark is a symbol/sign that identifies your products or services. A trademark can be words/pictures or a combination of both, & looks like this


Product Safety




The BSI mark is the body that tests products against criteria to approve for sale.



Companies have the option to apply for approval from the Energy Saving Trust to help sell products



The CE symbol is like the BSI mark, and reassures European consumers that the product is safe



This symbol shows that toys meet strict British safety and advertising standards.

CAD/CAM



C.A.D – Computer Aided Design

Uses a range of software to help develop a product using virtual 2D and 3D “drawings”.

Good Points

Can convert drawings ready for manufacture
Removal of most human error
Virtual testing models
Can make changes/improvements easily
Improves communication

Bad Points

Not ideal for initial ideas
Loss of employment
Cost of training high

Batch Production

- A flexible scale
- Production can change
- Assembly line used
- Products produced in reasonable numbers

Bespoke Production

- Highly specialised
- Very low numbers
- Skilled workforce
- Expensive costs

Mass Production

- High set up costs
- High volume
- Low cost products
- Unskilled/Skilled workers

Continuous Prod.

- Runs 24 hours a day
- Vast numbers
- Relies heavily on CIM
- High Quality Control

C.A.M – Computer Aided Manufacture

Processes and equipment that allow products to be manufactured by machines operated by computers.

Good Points

Cost effective and fast compared to hand built
Removal of human error
Increased safety as human contact minimal
Can manufacture continuously without breaks
Integrated quality control

Bad Points

Traditional skills are lost
People replaced by machines
High initial set up costs

Manufacturing

CIM *Computer Integrated Manufacture* is the process whereby every single step in the manufacture of a product incorporates the use of computers.

Key Facts

- Designing using a CAD drawing program
- Testing via Virtual Simulation/machines with computer sensors to record data
- Prototyping models using CNC machines (3D Printing)
- Controlling stock by scanning codes on parts
- Using Robots to manufacture components
- Intermediate scanning/testing using sensors for Quality Control

JIT

Just in Time is a Japanese based concept whereby all the parts needed for a product arrive at the factory at exactly the moment they are needed. It is very efficient and there is no waiting around.

Key Facts

- No storage/warehouse costs to the company
- Efficient use of time to save money
- Easy monitoring of stocks/parts
- Increased scope for other companies to supply parts

- Relies on punctuality of delivery
- Risk of wrong parts arriving
- Environmental bad due to lots of deliveries.

Modelling and CAD Development



What is modelling?

Modelling is an inexpensive tool designers use to refine and communicate their ideas to clients and manufacturing companies.

It allows designs to be moved forward and improved.

Modelling can also help you test:

- Ergonomics
- Materials
- Construction

Types of Models

- Quick Modelling -** These are the first initial models you will make of an idea. You will use materials that are easy to hand, such as paper and card.
- Prototyping -** This is a type of modelling that happens later on in the project. When the idea is more refined. The model will be an accurate reflection of what the final idea will look like and how it will work. It will help manufacturers to determine dimensions and a final product spec.
- CAD Modelling -** Ideas can be modified rapidly, shared electronically, and even involve virtual testing!

Using ICT as a Design Tool:

Computer Aided Design (CAD) allows designers use many different software programmes to help develop ideas.

CAD can help you "render" an idea, giving it a realistic colour or material effect.

CAD can allow you to run simulations of constructing the ideas, or testing materials and how they stand up to various forces.

It can also help you to see all the different components separately, in what we call an "exploded view".

Manufacturers find CAD modelling vital, as they can find out accurate dimensions and other details of the product from a single "engineering drawing" – which can be produced at the click of a button from a CAD programme.



Types of Modelling Materials:

Paper and Card	Easy to cut and fold Paper not as rigid as card
Corrugated Card	Easily available Good for large scale models Not easy to fold
Polystyrene Foam	Good for shaping in solid block shapes Lightweight and glues well
Foamboard	Clean and crisp models Can be cut with a knife
Balsa and Jelutong	Can be cut in a school workshop Sanding gives smooth finish
Wire and Straws	Good for representing piping and tubing Wire easily bent into complex shapes
Polymorph	Can be reused Easy to shape by hand or by using moulds Can be painted

Quality Control and Quality Assurance



What is it?

Quality Control: a check made to ensure that a component meets the specification a manufacturer has set. For example: correct shape, size or colour.

Quality Assurance: A complete system of ensuring quality control checks are carried out correctly throughout the manufacture of a product.

Examples of QC

- Measurement checks
- Process checklists
- Sign in/sign out of tools (to ensure they don't get left in a car engine for example!)
- Product testing
- Visual checks
- Use of CAD/CAM
- Use of templates, jigs or gauges

Examples of QA

- Paperwork – sign off sheets/checklist
- Systems where certain staff are responsible for certain parts/jobs. Traceability.
- On-going staff training programmes
- Supervisors overseeing staff checking procedures
- Standard symbols awarded to approved products (CE symbol or BSI kitemark)

Benefits of applying QC and QA checks to the manufacturer are:

1. Standard and consistent quality parts reduce manufacturing costs
2. Makes production run more efficiently
3. Reduces the risk of incorrect or bad quality parts being made
4. Allows products to get approval for sale to the public
5. Improves safety standards in production
6. Workers standards and "manufacturing pride" increases

And the benefits to the consumer?

"I would be reassured of the quality and know that the product will be safe to use."

"I would be encouraged to buy from the same company again and again."

"I can hold somebody to account if something does go wrong."

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