Problem Solving: Scissor Lift Mechanism

Learning objective

To develop students' problem solving capability by guiding them through a mechanical systems problem.

Situation

Builders, building inspectors, painters, plasterers and others often have to work high off the ground. An alternative solution to ladders and scaffolding is a machine called a "scissor lift".

A scissor lift consists of a platform supported on a lazy-tong linkage.

The Scissor Lift system

The known parts of the scissor lift system are:

- a lazy-tong linkage is used to lift the platform
- the platform is attached to the lazy-tong linkage
- the platform is lifted and lowered by the lay-tong linkage.

Problem solving

1. How do lazy-tongs work?
2. How could a platform be balanced on lazy-tongs?
3. What could be used to make the lazy-tong linkage move the platform up and down?
4. How could the platform be attached to the lazy tongs so that the lazy-tongs still work and the platform is safe to use?

Input	Control	Output
Power from internal combustion engine or electric motor	Lazy-tongs mechanism	Platform rises

What you must do

1. Analyse the problem so that you understand it fully.
2. Make a list of mechanisms that would make the lazy tongs lift the platform up and down. Use notes and sketches to record your ideas.
3. Choose the mechanism that solves the problem the most effectively.
4. Use notes and sketches to illustrate your best design.
5. Evaluate your design and modify it if necessary.

You may use research methods to find information about suitable mechanisms, e.g.

- product analysis
- library search / computer software search
- internet search
- experiments - model your ideas, e.g. using mechanisms kits
- interview - ask an expert.

Success criteria

You have:

- Analysed the problem and have worked independently and with others to find solutions to it.
- You have used research methods to find information.
- You have recorded ideas and your research findings.
- You have used your research and other ideas to develop a solution to the problem.
- You have produced an accurate drawing or model of your solution to the problem.
- You have evaluated your solution to the problem and modified it if necessary.