

Introduction

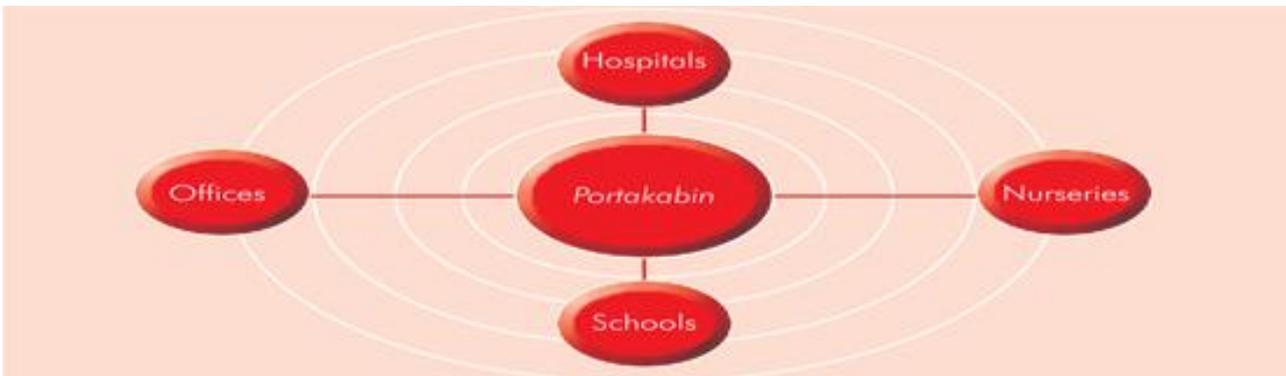


Portakabin is an international company. It produces some of the most advanced building systems available. The company is part of the £700 million turnover Shepherd Group. The Shepherd Group is one of the largest family-owned companies in the European building industry and employs 3,500 people. It focuses on three main areas:

- manufacturing
- construction
- property.

The name *Portakabin* is a registered trade mark. This instantly recognisable sign means that no other company can use the *Portakabin* name on its products. Donald Shepherd, the founder of *Portakabin*, came up with the idea of stand-alone re-locatable buildings in the 1960s. Since that day, only buildings produced by *Portakabin* can be called *Portakabin* buildings. *Portakabin* uses modular buildings. This means they are made up of one or more modules that are constructed in a factory environment. These are then linked together to form multi-purpose buildings.

Typical examples of *Portakabin* buildings include:



Portakabin buildings can be erected almost anywhere in the world. *Portakabin* is able to deliver the same high quality buildings across the globe because it closely monitors processes and standards during production at the *Portakabin* site. *Portakabin* is able to deliver value to customers by manufacturing products that exactly meet customer requirements.

Lean production is an approach to production that seeks to minimise waste and inefficiency. In short, it means doing more with less. A lean company will make the very most of its resources. Lean production is based on the principle that any use of resources that does not create value for the consumer is 'waste'.

This case study focuses on how *Portakabin* uses lean production methods to ensure it produces a quality product that gives value to the customer.

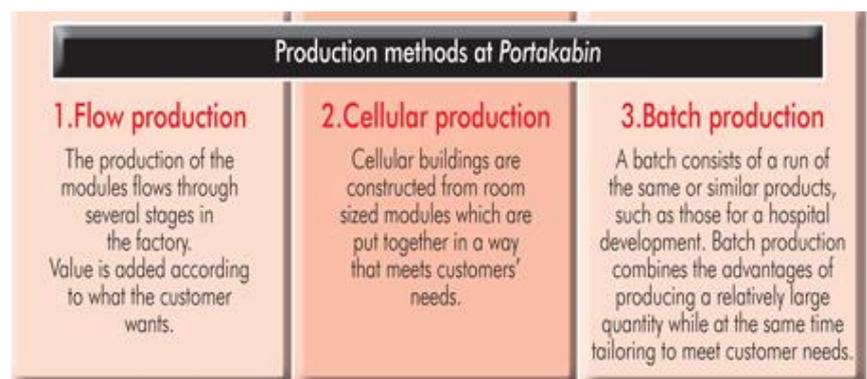
What is lean production?

The aim of lean production is to reduce the quantity of resources used. Lean production should mean less use of labour, materials, space and time. *Portakabin* uses three main production methods.

Portakabin is working towards eliminating waste in each of the three areas. Lean production makes it possible to eliminate waste by reducing defects so that products are 'right first time' and are of a quality that meets customer requirements.

Quality is a top level objective for the company therefore *Portakabin* uses a Quality Management System. The

purpose of this is to make sure that every aspect of what the company does is designed to give customers



what they want, for example, a safer learning environment or a more inspiring office. High quality is supported through a process known as Kaizen. Kaizen is a Japanese term which means continuous improvement. Kaizen is typically achieved through small, regular steps rather than the occasional large change. It enables everyone at all levels in the organisation to contribute to improvements. Everyone who works for *Portakabin* is encouraged to suggest ways of improving production. New ideas bubble up from employees at every stage. For example, an employee in stores may have a good idea about how to manage stock more effectively. Everyone is therefore working to improve quality and give better value to customers.

Portakabin is approved to meet the International Standards ISO 9001 and ISO 14001. In order to gain these awards, companies must prove their achievements to International Standards Organisations. Being accredited to International Standards tells customers that an organisation meets the tough guidelines set by awarding bodies.

Meeting ISO 9001 shows that *Portakabin* has a Quality Management System which among other things ensures that:

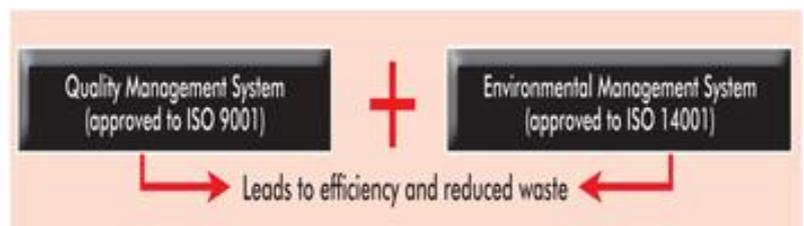
- it has a documented set of procedures for all key processes in the business and that these processes are checked for efficiency
- outputs are checked for defects and put right where necessary.

Meeting ISO 14001 shows that *Portakabin* also has a well organised environmental management system. An environmental management system helps an organisation to reduce its impact on the environment and minimise pollution.



The emphasis on quality can be illustrated by the *Portakabin Lilliput* products. *Lilliput Children's Centres* are designed to be child-focused. They meet the tough safety and care standards that have been created to protect children:

- The Children's Centres provide a resource for the whole community.
 - They can be built in half the time it takes to build using traditional methods.
 - Multi-functional rooms can be used as kitchens, crèche facilities, and training rooms as well as nurseries.
- This contrasts with the much slower process of traditional building with bricks and mortar. These buildings take far longer to construct and building work may be delayed, for example, by poor weather.



Just-in-time production



Just-in-time is perhaps the best known method utilised within a lean production environment. It is a process which aims to reduce the costs of holding stocks. Finished goods, work in progress and raw materials are kept to a minimum level by ensuring that stocks are only produced when they are needed. Holding stock adds to business costs in a number of ways:

- Firms have to pay for the storage space where stocks are held.
 - Cash is tied up in stored stocks rather than allowing working capital to be used more efficiently.
 - Regulations or customer requirements may change which could render current stocks unusable.
 - Any defects in large quantities of stock may cause costs of rework.
- With just-in-time, the demand for new buildings 'pulls' supplies through the system. This is a very important business principle. When demand



increases *Portakabin* orders and builds new component supplies, rather than having these in stock 'just in case'. For example, the *Portakabin Ultima* range consists of high quality workplaces for up to 1,000 people. In order to meet the demand from businesses for these buildings *Portakabin* only holds the stocks it needs for orders in process. This reduces costs and ensures that the components ordered specifically meet the requirements of the individual businesses.

Detailed information technology systems are used to manage the flow of production. These record supplies at every stage of production to ensure components are available exactly when required. Good relationships with suppliers are also necessary as any delay in delivery of raw materials can hold up the entire production process. JIT also helps the internal *Portakabin* production process by providing components only when needed by the next stage of production.

Reducing waste

The *Portakabin* lean production process encourages waste reduction. Building in a modular way is a lean process. The off-site construction and installation of completed and fitted out modules means that fewer workers are required on site and there is less transport needed. *Portakabin* has been able to reduce the volume of waste sent to landfill by 60% over the last three years. This has been achieved by:

1. Cutting out waste from the manufacturing system.

Portakabin has thought carefully about how it can improve design to reduce waste in manufacturing. Examples of how this has been achieved include:

- clever design of the modules. This maximises the use of standard width materials and minimises cutting to fit
- re-use of materials, for example, door and window shapes cut out from insulated wall panels are re-used for floor insulation
- changes in materials used. For example, a new type of insulating foam has reduced material use by 10%
- steel beams are supplied to the factory already cut to the precise length required
- the boards used for floors in *Portakabin* modules are pre-sized. No trimming is required. As a result no wood particles or dust is created.

2. Recycling waste

The *Portakabin* Group, recycles 65% of waste generated in off-site manufacturing:

- Staff are trained always to think about recycling. For example they learn to use colour coded bins for different types of waste. Recycling in a *Portakabin* factory is much easier to manage than it would be on a building site.
- *Portakabin* has set up waste management teams. These are made up of a production manager and waste contractor. A permanent trainer works for the company and employees are regularly given refresher courses to update them on new ideas.
- Pallets used for transporting *Portakabin* products are recycled at every stage of the supply chain.



Benefits of lean production

Lean production can be seen as providing a win/win/win situation.



Financial benefits

The *Portakabin* production methods reduce the cost of constructing high quality building projects. The lead time between a customer placing an order and the end product being ready is much shorter through the use of the latest technologies under controlled conditions.

The main financial benefits include:

- predictable construction. The construction is factory based so it is not disrupted by weather conditions or site related problems. 99.6% of *Portakabin* projects are delivered on time and on budget. This compares with a traditional construction industry average of 63% on time and 49% on budget
- speed of construction. Build times are up to 50% faster than those in traditional building projects
- quality control. The *Portakabin* Quality Management Systems and use of lean manufacturing techniques guarantee high quality at every stage of production.



Environmental benefits

There are a number of important environmental benefits, including:

- better thermal performance. Tests carried out on the *Ultima* buildings show that they exceed air permeability requirements by 70% meaning that the buildings have minimal air leakage and are therefore thermally efficient
- ozone-friendly materials. The insulation materials used in the walls, roof and floors have an Ozone Depleting Potential (ODP) of zero meaning that their manufacturing process does not harm the ozone layer
- reduced noise and pollution. Fewer vehicle movements to construction sites minimise traffic pollution
- recycling of materials. The buildings are constructed in sections. Later they can be taken apart in simple steps. The steel is 100% recyclable so 96% of the total building is recyclable.

Social benefits

There are also benefits to the wider community. For example:

- improved health and safety. Factory-based construction is much safer than a traditional construction site
- there is far less noise, lorry movements and other nuisance factors to local communities.

There are some potential drawbacks of lean production. For example, everyone involved in supplying the new buildings is dependent on the previous stage of production. Delays in deliveries of stock when using a Just-in-Time system can affect the next stage. Adhering to quality standards can take extra time and people which all add costs to businesses. However, if managed carefully, the benefits of adopting a lean approach to production far outweigh the drawbacks.



Conclusion



Portakabin provides solutions to help other organisations to manage their changing accommodation requirements. Its modular buildings are put together using lean production methods.

Lean processes provide an environmentally-friendly approach in a world of scarce resources. Materials are used more effectively. Time is used more efficiently. Less waste is generated at every stage of lean production. *Portakabin* modular buildings can be put up very quickly. Problems associated with conventional new buildings such as delay or overspending are eliminated. The net effect is a win/win/win situation for *Portakabin*, its customers and the environment.