

7Ws Elimination of waste – Management training article

The 7Ws – Taiichi Ohno's Categories of Waste

Taiichi Ohno is a production engineer whose formative years were spent in the textiles division of the Toyota Corporation, and who moved to the automotive business in 1943. Ohno is usually referred to as the Father of the Toyota Production System (TPS), which is itself the basis for what is considered in the West as Lean manufacturing.

In fact, the TPS was first launched in the West as Just in Time, or JIT, when the initial visits from the US and Europe to see how Japanese industry had stolen such a march resulted in people returning with stories of factories which made only what was required, when required. No wonder these people were capturing all our markets when they carried no stock and didn't need complex computer systems to plan production. All they had was little yellow cards which sat on the side of tins, stillages or baskets and instructed Machine Shops to provide components for their colleagues (or customers) in Assembly.

Later, of course, we realised that there was more to it than this – these little yellow cards (or **kanbans**) only worked because of all the thought and effort that had been expended in creating a factory that challenged the basic concepts of manufacturing. We realised that JIT was about more than stock and batch quantities and when John Krafcik, a researcher in the late-1980s MIT study into automobile manufacturing, coined the term **Lean Manufacturing**, it seemed appropriate.

Lean, in basic terms, means the elimination of waste (or Muda, in Toyota-speak). Ohno identified seven wastes to be addressed by the Toyota system, and they have become known as the 7Ws.

So what are the 7Ws?

Defects

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The simplest form of waste is components or products that do not meet the specification. We all know about the Japanese scaring us with their target of single-figure reject rates when we realised that they measured in parts per million and that 1% defects gave a figure of 10,000. Of course, the key point of Japanese quality achievement came with the switch from Quality Control to Quality Assurance – efforts devoted to getting the process right, rather than inspecting the results.

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Over-Production

A key element of JIT was making only the quantity required of any component or product. This challenged the Western premise of the Economic Order Quantity (EOQ) which was built on acceptance of fixed ordering costs, built around set-up times, and thus the need to spread these fixed costs over large batches. Another Japanese guru who contributed to this change is Shigeo Shingo who led Toyota's move from long set-ups to Single Minute Exchange of Die (or SMED).

Waiting

Time not being used effectively is a waste – we are incurring the cost of wages and all the fixed costs of rent, rates, lighting and heating so we should use every minute of every day productively. Ohno looked at the reasons for machines or operators being under-utilised and set about addressing them all. Thus we have learnt about preventive maintenance and the creation of flow through our factories with the emphasis on **takt time**, the rate at which a component or product moves to the next stage.

Transporting

Items being moved incur a cost, if it is only the energy needed to initiate the movement – such as the electricity absorbed by a fork lift truck. Of course, movement brings another cost, which is less visible but of far greater impact. Managing a factory with operations carried out great distances apart is much more difficult than when the subsequent stages are adjacent to one another. This can be seen as the primary driver behind cellular manufacturing (though some would point out that Group Technology is very similar and came from Sweden, rather than from the Orient).

Movement

On a related note, people spending time moving around the plant is equally wasteful. The time a machine operator or fitter wastes walking to the toolroom or the stores for a fixture or a component could be far better utilised if our plant layout and housekeeping were geared around having everything that is required close to hand.

Inappropriate Processing

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The most obvious example of inappropriate processing from my own experience relates to surface finishes that required components to be moved to grinders for completion, when in fact such finishes served no purpose. A basic principle of the TPS is doing only what is appropriate.

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Inventory

The element that Western industry immediately focused upon when confronted with JIT was the cost reduction available from holding less inventory. The fact that the initial fact-finding trips to Japan took place when interest rates were at breathtakingly high levels (my own mortgage was at 15%) perhaps contributed to our failing to see the other costs that Ohno had considered in his own interpretation. We now know that stock hides problems and that problems are pearls in that finding a problem is a good thing – now we can solve it, which we couldn't until it came to light!

In fact, other forms of waste have been identified in Lean definitions since the term was first adopted, though strict devotees of the TPS have been known to dispute matters. Womack and Jones, the leaders of the MIT Study, added that of designing and making products which do not meet the customer's requirements, though this could perhaps be classified within Ohno's Inappropriate Processing.

As ever, we can debate the semantics and draw clever diagrams to show how matters overlap, or we can get on with bringing about change for the better within our organisation. I hope that people who know me would recognise the camp to which I belong.

Ian Henderson