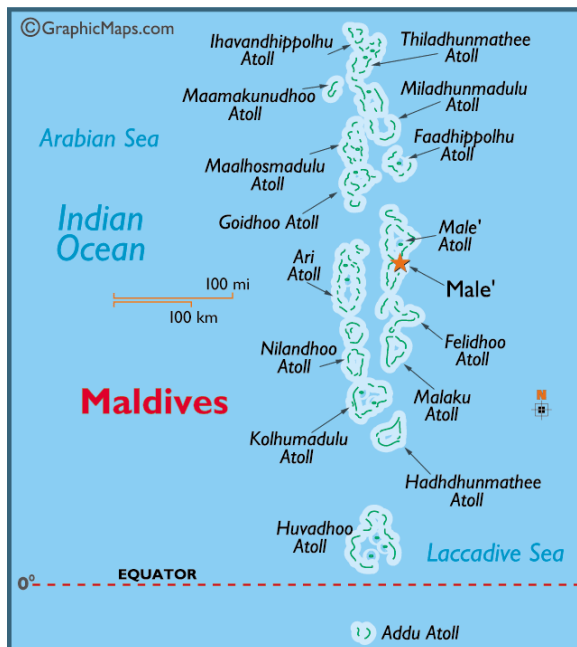


SUSTAINABILITY TIMES

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The Maldives: Canary of the Next Century?



The Maldives, from <http://www.worldatlas.com/webimage/countrys/asia/mv.htm>, accessed 2/14/10.

The Maldives is a chain of atolls located in the Indian Ocean a few hundred miles southwest of the southern tip of the Indian subcontinent. The 115 sq. mi. nation consists of 1200 atolls and has just under 400,000 inhabitants. The country is a member of the British Commonwealth. One of the most distinctive characteristics of this nation is that its *maximum* elevation is 6 ft. above sea level while most of the land area is below 3 ft. The economy is primarily based on fishing and tourism, which depends on its beaches and lagoons¹.

It is the country's extremely low elevation and its dependence on its oceanic environment that brings it to our attention here. The Maldives are one of the world's areas that are most vulnerable to rising sea level. A total increase in sea level of only one foot would inundate a significant percentage of this little nation, taking with it land and resources needed by the economy.

If current global warming trends are not changed by human interventions, world-wide sea levels may well rise up to a meter by the end of the Twenty-First Century, leaving the Maldives seriously reduced in land area. The atolls would be much more vulnerable to storms and even normal waves than they are today. The President of the Maldives, Mohamed Nasheed, has established a national fund for the future purchase of a new homeland when the nation becomes uninhabitable. Australia and India are considered likely sites for this new homeland. In addition, Nasheed is focusing a great deal of effort on making the Maldives a carbon-neutral country by 2020 so that the day the country must move can be delayed².

Many years ago, before the invention of air-sampling technologies, mine owners would put canaries in cages in the mines. When the canaries stopped singing, the miners knew the air was bad and would evacuate. The Maldives seem poised to serve a similar purpose in monitoring the effects of global warming.

¹<http://www.answers.com/topic/maldives>, accessed 2/14/10.

²"Leaders and Visionaries," Time Magazine, 10/5/09.

Learning from Toyota's Problems

Over the past couple of months, we've all been reading about how the great Toyota Production System, the very Bible of Lean Production, has failed. [Time Magazine](#), [The Wall Street Journal](#), [Newsweek](#), [The New York Times](#), and many other publications are following the story. Toyota has had to recall nearly 7 million cars since November, which is about 90% of its 2009 sales. Accelerators get stuck and brakes don't work. Accidents are happening and people are dying. What happened to the vaunted quality that is produced by the world-famous Toyota Production System? Are we fools for trying to emulate this manufacturer? How could they go so wrong?

The roots to these problems go back at least to 2002 when reports of accelerators sticking first surfaced. After looking at the problem the company blamed the floor mats, saying the pedals could catch on the mats and not come back to the neutral position when the driver reduced pressure on the pedal. Finally in 2007 some recalls of the floor mats were made. Currently, the problem is being blamed on a wearing of the gas-pedal assembly itself and is being repaired by installing a small shim in the pedal assembly.¹ Did Toyota misdiagnose the cause of the problem in 2002 and for almost eight years following?

As we write this, it is not possible to say what the technical causes of these problems are or why they have been so hard for Toyota to find and fix. But we would like to respond to the suggestion that it is the fault of the Toyota Production System or Lean Systems in general. Is there a weakness in the principles of lean production, a problem with implementation, or something else causing these problems?

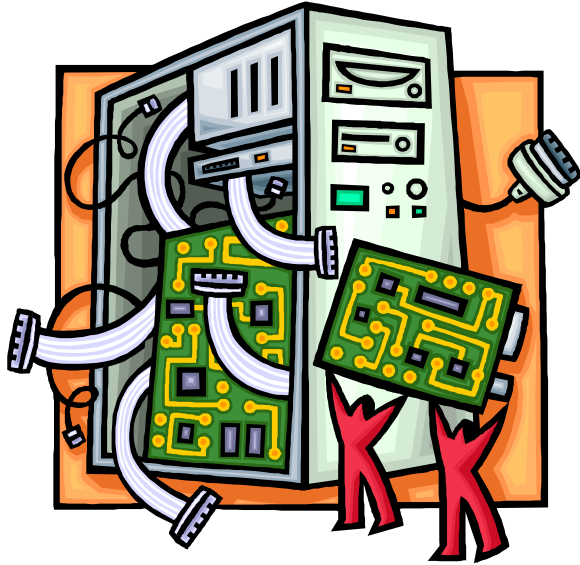
Karen Martin, a top consultant and trainer in Lean Production Systems, believes the central error is in the application of continuous improvement efforts.² She says, "Continuous improvement is a system of proven principles and tools that, *when properly applied*, work in any organization, in any industry. But -- here's the catch -- continuous improvement requires an **environment** of relentless problem-solving, integrity, workforce engagement, transparency, and humility. Without these foundational values in place, no continuous improvement approach will be successful over the long haul." She goes on to note that a shift in focus at Toyota may have laid the groundwork for this quality issue. "In 2002, then President Fujio Cho replaced Toyota's long-standing goals that centered on the *customer* to one that centered on capturing *market share*."

So, should we abandon Lean Production and look elsewhere for ways to manage our companies? No, no, no! What should be learned from Toyota's current misery is that we must never move our focus from continuous improvement, building amazing quality, and creating an environment that always supports these efforts. Toyota has achieved amazing growth, becoming the world's largest automaker in 2008, but the shift in focus has affected the company's ability to continuously improve its product quality. We should learn to never leave the basics of Lean Production.

We wish Toyota good luck in solving these problems. We hope all Lean companies can learn from their current troubles. Good, long-term Lean Production Systems work, but the company must always keep its focus on improvement. Always. Forever.

¹Sapoito, Bill, "Toyota Tangled," [Time Magazine](#), 2/22/10, p. 29.

²Martin, Karen, "Toyota's Woes," [Karen Martin and Associates February Newsletter](#), 2/11/10.



Waste Reduction Technique of the Month

Design for Disassembly

Lean Production Systems suggest many ways of operating more efficiently. One well-accepted technique for reducing wasted time, effort, and materials on maintenance tasks is to carefully design products so they may be disassembled quickly and easily. Products that have been designed with disassembly in mind are also easier to recycle than "standard" products.

Companies that produce and sell products often allocate significant engineering effort to designing their products for ease of manufacturing. However, in

addition to designing for manufacturability, the sustainable company should design its products for disassembly as well. The traditional view of product engineers has been to design products that are as solidly built as possible, using various types of assembly methods (adhesives, nails, rivets, soldering, welding, etc.) to be sure the parts of the product are firmly attached.

Creating efficient maintenance operations often means that some forms of assembly will yield products that come apart easier than others. For example, a product which may require that worn parts be replaced from time to time may be easier (quicker and cheaper) to repair if parts are not soldered, welded, or glued together, but if they are held together with nuts and bolts or snapped in place. If products are designed with as much emphasis on how they come apart as is usually put on how they stay together, they will likely be more efficiently maintained.

Environmental responsibility presents a new objective for product design engineers. It now becomes important to look at end-of-product-life issues such as recyclability. Certainly the products that are easiest to recycle are those that are composed of only one material (glass bottles, aluminum cans, newspapers, cardboard boxes, many plastic items, etc.). Many modern products (electronics, autos, appliances, etc.) are much more complex and may have a number of types of materials in them, some in very small quantities. These complex products cannot be recycled as a unit, but must be broken into single-material components before they can be recycled. Therefore, designing a product so that it can be easily and cheaply broken into components is a significant contribution to the environmental sustainability of the product. In Germany, where auto manufacturers are responsible for recycling their old products, the design for disassembly becomes an important cost savings at the end-of-product-life when the company is then responsible for recycling the remains of the dead product.

If you make a product, design efficient maintenance and recyclability into your product by integrating disassembly into its design. This technique illustrates the synergy of Lean and Green Systems as it yields reduced costs related to maintenance while at the same time making recycling more cost effective. Design for Disassembly is one of the principles of Zero Waste Operations.

Did You Know ... ?

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Now That We Know

By Paul McCright

The *global climate crisis* may one day become the *global climate catastrophe*. We now know that. What will determine if this happens is the collective actions of our governments, our industries, and our people. In about 250 years, since the dawn of the modern industrial age and the resulting heavy reliance on fossil fuels, humanity has accomplished enormous progress and has completely transformed the way humans live, bringing prosperity, freedom, health, and happiness to billions. Of course, in the process, humanity has largely unknowingly threatened future life on this planet. The current global climate crisis is not the result of a wanton disregard for the future, but of an ignorance of the underlying science that has placed us on the path to oblivion. What has changed is that *now we know*.

The massive effects of humanity's tremendous reliance on fossil fuels took over two centuries to become noticeable, but in the last few decades its effects have become pervasive in all parts of the world and in countless different ways, from the melting of glaciers and polar ice caps to weather malfunctions of apocalyptic magnitude. These effects are long-term results of a steadily increasing build-up of heat-trapping gases in the upper atmosphere.

To solve humanity's greatest existential threat, a long-term viewpoint is necessary. We must begin to end our society's dependence on fossil fuel and work unrelentingly to find ways to continue society's progress while simultaneously reducing society's deadly legacy and allowing the natural healing of the environment. Over the next half century or so these efforts must be taken religiously until the time comes when society can function and progress without impacting the ability of later generations to live successfully on Earth. This is the very definition of sustainability, but a whole-Earth sustainability cannot happen without decades of transitional hard work and allowing the slow repair of the environment to happen naturally (or perhaps with help from as-yet-undeveloped new technologies).

All governments, organizations (including industrial, commercial, and societal), and individuals need to look at their routine activities to determine how they can change them so that each year in the future sees their contributions to greenhouse gases declining even as they grow in numbers and productivity. Only by adopting such a long-term viewpoint and taking incremental steps *because it is the right thing to do* and *because the survival of our world depends on it* can the damage eventually be undone and the global climate catastrophe be averted. **This generation will determine the future of humankind.**

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