Five Ways the Internet of Things Impacts Manufacturing

Manufacturing has always been about building things quickly, accurately and at the lowest possible cost. Much of what we lump into the whole science of production management is specifically aimed at process improvement as measured in terms of speed, quality and cost.

The Internet of Things brings an entirely new level of potential to this arena. IoT will facilitate communication of machine tool tolerance status, defect trends, identification of scheduling constraints and capacity, advanced notice of supply chain disruption and quality control issues. These all will improve with the ability to interconnect and facilitate communication between devices.

Here are five specific areas in manufacturing that will be impacted by IoT.

Demand Generation

MRP, lean and demand flow manufacturing all have sought to eliminate the making of stuff that no one wants or at least that can't be profitably sold. For years, sales drove this by predicting what they would sell over a given period of time. Manufacturers would build as much of the product as possible to minimize costs.

Later, manufacturers started building only those things that were actually ordered downstream. The order would trigger events all the way back to the beginning of the supply chain. This minimized the amount of unsold manufactured goods that had to be stored by the manufacturer.

Machine-to-Machine order management will facilitate orders for goods that are submitted by machines. Consider healthcare, where disposable complex products are in daily use. The Central Stores facility within the hospital places an order to the manufacturer based on inventory counts and usage history.

These automated M2M service relationships will prove to be durable and difficult to displace according to Cisco's Maciej Kranz.[1]

This can happen on the assembly line, warehouse or regional distribution center.

Production Scheduling

One of the toughest challenges for lean manufacturing is catering to demand but also planning production in a way that maximizes the effective use of the production process and assets.

IoT will facilitate much of this by communicating pending orders based on usage and integrating forecasting probabilities into the requirements planning at the production facility. This process moves sensor and human-based data upstream in the supply chain to facilitate better planning from the raw-material end to the finished goods end of production.[2]

1 – KPMG The Mobile Evolution – The Internet of Things: How M2M Communication Is Changing the Mobile Environment – Sanjiv Krishna and Maciej Kranz

2 – McKinsey & Associates – The Internet of Things and the Future of Manufacturing – June 2013 – Loffler and Tschiesner
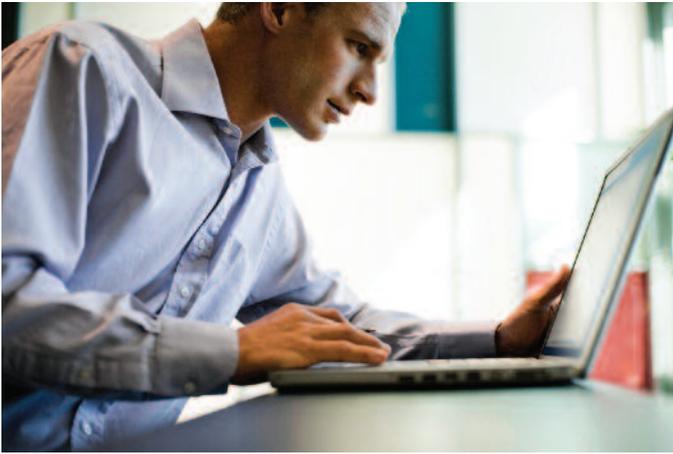
Production schedules will be much more dynamic as demand-planning ebbs and flows occur within the process. Altogether, these will ensure a more tightly planned scheduling that is more responsive to short-term change and normal peaks and valleys of production planning. Multiple sources at critical points within the supply chain will assure availability of products, parts and supplies downstream.

This will challenge suppliers to maintain adequate inventory but most importantly, they will need to be connected into this data web in order to participate.

Plan Maintenance and Asset Management

One of the most costly parts of operating a manufacturing facility is handling the maintenance and repair of production machinery. Everyone is familiar with the massive re-tooling effort that takes place within the automotive arena with each change of model year.

But unscheduled maintenance is costly and can devastate a production schedule. Sensor-based reporting from machines operating online will enable part replacement, re-tooling and other unscheduled repairs to be predicted and incorporated into the actual production schedule.

Replacement parts or even entire devices can be ordered in advance of actual failure. Maintenance or repair can be incorporated into normal maintenance times without impacting the actual production schedule. Cisco System's Maciej Kranz estimates cost savings of around 20 percent and uptime increases approaching 75 percent using these techniques.[3]

Supply Chain Management

Supply Chain Management (SCM) today involves complex webs of suppliers extending across national borders, continents and oceans. M2M connectivity upstream and downstream is critical to take advantage of the IoT. SCM that involves more predictive capabilities relating to availability from multiple sources will establish better redundancy within the supply chain as a whole.

The notion of this level of connectivity may seem fantastic, but this is the vision many share—the entire supply stream interconnected and linked.[4]

Political instability, natural disasters and regional price volatility will be incorporated into the vendor or sourcing selection decisions that are made on an ongoing basis. Supplies and parts moving downstream will be ordered based on the supplier's ability to interconnect and report pricing and availability in real time.

In the old days, companies ordered vast quantities of raw material and parts to drive volume-based discounts. This strategy was replaced by on-demand requirements with pricing flexibility reflective of the planned amounts sold while still offering smaller individual orders spread over a contract period.

IoT will enable not only highly flexible pricing and on-demand availability but also early notification of inventory shortfalls and inability to meet demand downstream.

3 – KPMG – The Mobile Evolution – The Internet of Things: How Machine to Machine Communication Is Changing the Mobile Environment – Sanjiv Krishna and Maciej Kranz

4 – McKinsey & Company – The Internet of Things and the Future of Manufacturing – June 2013 – Loffler and Tschiesner – an interview with Robert Bosch executives, Siegfried Dias and Heinz Derenbach

Quality Assurance and Performance Reporting

One of the Apollo astronauts once famously responded to a question regarding what they thought about during liftoff. The response cited the fact that they were sitting atop 360 feet of low-bid machinery filled with highly volatile rocket fuel.

Quality is important to anyone buying a product. The ability to document quality processes, sources and supplies will be greatly enhanced with the connectivity of machines building and reporting on their operations. Additionally, the cost of goods manufactured will be greatly refined by identifying costly processes, machines and even entire production facilities.

This data, gathered and analyzed, will not only result in higher overall quality but also better decision-making related to maintenance, facility and asset selection for production jobs. Better data means better reporting and better decision-making.[5]

IoT will bring many changes to the shop floor and to the manufacturing enterprise as a whole. Successful companies will be connected companies.

[5] – Information Age – Making the Internet of Things a Business
       Reality – 24 November 2014 – Chloe Green interviewing Sean
       Lorenz, Technical Product Manager at LogMeIn