

# QCD: measuring manufacturing performance

dti

The DTI drives our ambition of 'prosperity for all' by working to create the best environment for business success in the UK. We help people and companies become more productive by promoting enterprise, innovation and creativity.

We champion UK business at home and abroad. We invest heavily in world-class science and technology. We protect the rights of working people and consumers. And we stand up for fair and open markets in the UK, Europe and the world.

*Achieving best practice in your business* is a key theme within DTI's approach to business support solutions, providing ideas and insights into how you can improve performance across your business. By showing what works in other businesses, we can help you see what can help you, and then support you in implementation. This brochure focuses on these solutions.

In an increasingly global market it is essential that UK businesses remain competitive. And seeking continuous improvement in all areas of your business will help you meet the challenge of this global competition.

In this brochure the automotive sector shares best practice by supplying seven key measures under the umbrella of Quality, Cost and Delivery (QCD).

Using these key measures, businesses in any sector can get things right first time more often – boost productivity, scrap reduction, get better customer satisfaction and reduce the amount of floor space needed.

The seven key performance measures are explained, along with examples of best practice from other businesses. Look at all the measures, then decide how you could apply them to make your business prosper.

**This brochure is for:** Any business that wants more efficient and productive.

**It covers:** The seven key measures under Quality, Cost and Delivery (QCD).

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# About this brochure

The seven key measures were developed by the Industry Forum of the Society of Motor Manufacturers and Traders (SMMT) and endorsed by the automotive industry in the UK.

But QCD (Quality, Cost, Delivery) is not sector-specific. The key measures can be used to improve production performance across a whole range of industries.

The table below shows how each of the seven measures, impacts on QCD.

	Quality	Cost	Delivery
1. Not right first time			
2. Delivery schedule achievement			
3. People productivity			
4. Stock turns			
5. Overall equipment effectiveness			
6. Value added per person			
7. Floor space utilisation			

This table shows how measures impact on the process



primary



secondary

# The benefits of QCD

## **CLARITY**

The measures can focus and clarify your priorities for improving your production management.

## **SIMPLICITY**

The measures simplify even a complex production process and identify a straightforward route for improvements.

## **FEEDBACK**

The seven QCD measures can be used to quantify the results of any changes to a process. The effect of a change can be compared with the status of the process before the change. QCD provides rapid feedback and quantifiable numeric comparisons.

## **BENCHMARKING**

QCD provides the basis for objective comparison with peer group businesses. This will highlight processes which offer better methods and practices.

## **THE BOTTOM LINE**

Using the tools and techniques will noticeably improve efficiency, which can lead to rapid return on investment and increased profits.

These QCD measures

- should be used together
- use simple mathematical equations to analyse production performance
- provide results which you can use as the basis of continuous measurement and improvement.

The case studies in this booklet share best practice by showing how QCD has helped real businesses.



## MEASURE 1:

# Not right first time

### WHAT IS IT?

Not Right First Time (NRFT) measures a product's ability to match a specification and is expressed in 'number of defect parts per million'.

### WHAT IS IT USED FOR?

Not getting things right first time means wasted effort, wasted resources and wasted production time – all leading to excess costs. To the customer, it means interrupted production flow, poor quality and ultimately higher prices. Reducing NRFT will help improve quality, cost and delivery.

### MEASURING NRFT

NRFT can be measured internally and externally in the production cycle. A defective unit is a unit that does not conform to specification and may be scrapped or reworked.

**Internally** – defective units identified within the production process.

**Externally** – defective units that are identified outside the production process, either from the supplier or at the customer's site.

Putting customer satisfaction first means putting the external defect rate before other elements of the supply chain. A low defect rate means customers will receive higher quality parts and consequently, there will be fewer interruptions to the flow of production.

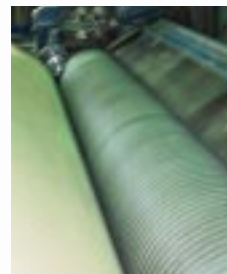
As 1% = 10,000 parts per million (ppm), the use of ppm to record defects magnifies NRFT for continual improvement.

$$\text{NOT RIGHT FIRST TIME} = \frac{\text{QUANTITY OF DEFECTIVE UNITS}}{\text{TOTAL QUANTITY OF UNITS SUPPLIED}} \times 10^6$$

UNITS: Parts per million



Name of Company: **UCB Films plc**  
Size of firm: 372 employees  
Location: Cumbria  
Website: [www.films.ucb-group.com](http://www.films.ucb-group.com)



### UCB Films used Not Right First Time (NRFT) measurement to cut waste in its production process.

The UCB site at Wigton in Cumbria contains a facility used to manufacture cellophane films. This process involves putting wood pulp through four main manufacturing stages to transform it into finished reels of cellophane film.

This method has been around since the 1930s and the business was concerned that levels of waste had become an accepted part of the process. However, when the management team decided to try and reduce waste, it found that it didn't have sufficiently detailed information to be able to isolate and remedy problems with the production process.

UCB Films contacted PICME, a government-funded resource dedicated to improving process manufacturing. Picme engineers worked with UCB Films on data gathering and analysis using the NRFT method. This enabled them to identify where the biggest gains could be made and consequently where the most effort should be made in reforming the production process.

Structured problem solving was then used by the UCB team to generate waste reduction action plans. The first step was raising awareness of the waste issue with the shop floor personnel. The team then worked with other operators to develop standard settings for machines to minimise the amount of good material lost.

With the short term measures proving immediately successful, the team moved onto longer term issues. It identified that the system used to request product width was the cause of a significant part of the waste. The team redesigned this system and a replacement is currently being trialled.

The business's waste reduction programme has delivered continuous improvement over the last two years, and spread across the whole UK operation.

The initial changes reduced the amount of material being thrown away at the final stage of manufacture by 0.7 %, which should increase to over 2% when the changes are rolled out company-wide. The new width control system should produce further significant savings.

Richard Story, Works Manager, is delighted with the changes that the business underwent. "PICME helped us challenge and re-examine our accepted performance norms," he says. "Having implemented the necessary changes, we've lifted our capability."

## MEASURE 2:

# Delivery Schedule Achievement

### WHAT IS IT?

Delivery Schedule Achievement (DSA) measures how well a supplier matches the planned delivery requirement of the customer.

### WHAT IS IT USED FOR?

The ability to deliver products on time is fundamental to customer satisfaction. However, 100% on time delivery must be achieved without unnecessary additional costs such as special deliveries, overtime payments, increases in stocks, scrap or rework costs. These additional costs are a reflection of a lack of control over the manufacturing process.

DSA is a function of good plant performance, which in turn is an indication of good management. Good plant performance is demonstrated when production flows through the plant without interruptions.

### MEASURING DSA

The DSA measures the actual delivery performance against the planned delivery schedule.

- Late and early deliveries are regarded as failures and are called 'not on time' in the measure.
- 'Incorrect quantity deliveries' are deliveries of too many or too few parts and parts that don't conform to the job, even if they can be reworked.
- If a delivery is both 'not on time' and 'incorrect quantity' then count it only once.

$$\text{DELIVERY SCHEDULE ACHIEVEMENT} = \frac{\text{NO. OF PLANNED DELIVERIES} - [\text{NO. OF NOT ON TIME} + \text{NO. OF INCORRECT QUANTITY DELIVERIES}]}{\text{NO. OF PLANNED DELIVERIES}} \times 100\%$$

DSA is expressed as a percentage



“The use of Industry Forum tools and techniques has transformed the performance of this vitally important manufacturing cell. Within three weeks we achieved a DSA of 100%.”

David Mercer, Manufacturing Director



Name of company: **LINPAC Group**  
Size of firm: 460  
Location: Southend  
Website: [www.linpac-automotive.com](http://www.linpac-automotive.com)



LINPAC Automotive manufactures plastic internal and external trim components for many major car manufactures. The business was embarking on a continual improvement culture when it adopted the QCD measures.

Customers were concerned about the introduction of a new internal post finisher assembly as Delivery Schedule Achievement (DSA) was 36%. The components were moulded in-house and supplied to the assembly shop for painting and final assembly. An Industry Forum MasterClass team was set up and found during its diagnostic phase that the initially erratic customer schedules had evened into a steady climb. The assembly shop was unable to keep up with existing demand so the situation was getting worse.

LINPAC had decided to build another cell, doubling capacity. This would have improved the DSA, but at a serious increase in product cost. "With increasing customer dissatisfaction it looked as if the business was in jeopardy," says David Mercer, Manufacturing Manager.

The Industry Forum MasterClass team was created to improve the delivery performance of the assembly shop. First the team looked at whether the shop could theoretically meet the customer demand. They found that one station had a cycle time longer than needed to meet the customer demand. It became clear that this was the main cause of the poor DSA. By redistributing work and by eliminating waste the team re-designed the layout and process flow so that all the operator cycle times were less than required to satisfy the customer demand.

Now that the customer demand could be met the team improved cell design further to spread work evenly among operators. A simulated model of the cell was built out of cardboard, tape and glue to test out improvement ideas that came from both from the team and other operators.

"With the newly gained skills and confidence we have looked at other areas of the organisation for improvements. The results are encouraging as the original master class activity. It is now becoming a part of our everyday working," says David.

The results of using QCD have been impressive:

- DSA has been sustained at 100% since the workshop.
- The number of operators used to assemble the part was reduced by 20%.
- Floor space used was reduced by 63%.
- Distance parts moved within the cell was reduced by 29%.
- Lead Time to produce a stillage of parts, (the customers standard order quantity) was reduced by 36%.
- Not Right First Time was reduced by 88,000 ppm due to the reduced handling and eliminating stacking of parts between each operator.

## MEASURE 3:

# People Productivity

### WHAT IS IT?

People Productivity (PP) is a measure of the ratio between the number of good units made and the number of direct operator hours it takes to make those units. Using this measure can help control the people cost associated with production. This objective is to maximise the PP figure by either reducing the direct operator involvement, or increasing the number of good units made.

### WHAT IS IT USED FOR?

Measuring PP helps you focus in on a key element of product cost and reduces processing time, for example by reducing wasteful work and standardising the process. Best practice means avoiding overproduction.

### MEASURING PP

Work is defined under three divisions:

- Work which adds value in line with the customers specification.
- Work which does not add value, but is necessary under current conditions.
- Work which is wasteful and counter-productive.

A high PP can only be obtained when:

- most of direct employees' work is adding value to the process
- non-value added work is reduced to minimum
- waste is eliminated.

$$\text{PEOPLE PRODUCTIVITY} = \frac{\text{NUMBER OF GOOD UNITS MADE}}{\text{NUMBER OF DIRECT OPERATOR HOURS}}$$

UNIT: Units per direct operator hour

“With the increased People Productivity and decrease of scrap, operators find it easier and less stressful working on the process and are exceeding targets.”

Yuasa Automotive Batteries (Europe) Ltd



Name of company: **Yuasa Automotive Batteries (Europe) Ltd**

Location: Birmingham

Size of firm: 500

Website: [www.yuasa.co.uk](http://www.yuasa.co.uk)



Automotive batteries were first manufactured on the site in the 1920s and Yuasa has wholly owned the factory since 1997. The business produces batteries mostly for passenger cars (original equipment manufacturers and aftermarket), but also for commercial and off-highway vehicles.

“The late nineties brought about a situation where our products were being imported from elsewhere within the world, at significantly reduced costs. It was very clear that the UK operation needed to match many of these costs but still deliver superior quality and delivery. A significant part of this task comes from people productivity. This was the prime area of focus,” says Marcus Heather, Managing Director.

The team chose one area of operation for the QCD exercise and manufacturing line management was identified as key to supporting the improvements and developing a sustainable process.

The output of the lines chosen had untapped capacity. Releasing this would have two benefits:

- reduction of overtime, freeing capacity
- reduction of internal costs.

The Industry Forum team carried out an in-depth analysis of performance within the chosen area and a process was identified for improvement. The primary measures of performance were Non-Right First Time, People Productivity and Overall Equipment Effectiveness (QCD measures 1, 3 and 5).

Wasteful activities were identified and countermeasures put in place. Daily check sheets for the operators and preventive maintenance systems, together with standardised operations and visual controls, were implemented.

Targets were set for each improvement that was to be made. In addition to the hard measures of QCD performance, ideas relating to planning, leadership and ownership were taken on-board.

The team made an effort to challenge all fixed ideas and would ask ‘why?’ five times when thinking about processes and improvements.

As a result of the process:

- People Productivity had increased 65% by the final Industry Forum visit.
- Scrap was reduced 68%.
- 100% of employees were guided through process improvement philosophy.
- Time was made available for preventive maintenance.
- A faster, more effective communication system was put in place.
- The business gained greater produce awareness and operators become more empowered.

## MEASURE 4:

# Stock Turns

### WHAT IS IT?

Stock Turns (ST) is a measure of how frequently the stock (raw material, work-in-progress and finished goods) are turned over in relation to the sales revenue of a product.

### WHAT DOES IT DO?

ST is an important measure because it reflects the level of control and co-ordination of materials that flow through the process. Inventory levels (by value or quantity) are key indicators of the leanness of the process and are directly related to the simplicity of production flows. In contrast, excess inventory means unnecessary cost.

### MEASURING ST

ST ratios reveal how much control a business has over a process. Tightly controlled processes needs only low levels of raw material and work-in-progress (WIP).

A tightly controlled process is also more dependable, as the business knows how much stock it needs and does not have an excess of finished goods.

Ideally the operator aims to eliminate interruptions to the manufacturing process to keep the production stream continuous. With less interruptions, the production cycle can be reduced so that less inventory is tied up, releasing cash and valuable production space. Furthermore, improvements in ST could allow the supplier to respond faster to customer demands and work to much tighter schedules.

- Inventories of incoming parts measure the efficiency of the flow of materials from the supplier.
- Work-in-progress (WIP) indicates factory flow.
- The finished goods figure represents the available level of completed product for delivery to the customer.

Faster throughput time and frequent deliveries to the customer will result in lower values for finished goods.

$$\text{STOCK TURNS} = \frac{\text{SALES TURNOVER OF PRODUCT}}{\text{VALUE OF RAW MATERIAL + WIP + FINISHED GOODS}}$$

UNIT: ST has no units

Name of company: **Concord Engineering**

Locations: Birmingham

Size of firm: 50

Website: [www.concordengineering.co.uk](http://www.concordengineering.co.uk)



Concord Engineering manufactures small pressed components, up to a 250 tonne capacity, for vehicle manufacturers and tier one customers in the automotive market.

The business has two main facilities, a manufacturing plant and a distribution centre. The manufacturing was initially felt to be in most need of improvement and so Concord undertook an Industry Forum MasterClass activity to introduce tools and techniques of Continuous Improvement. This was sustained and cascaded within the manufacturing area. Concord was then invited to take part in an Industry Forum Supply Chain activity by a tier one customer and decided to focus on the distribution of parts to subcontractors and to the customer. The business was already monitoring QCD performance and it was clear that the main issue was the low Stock Turns ratio.

“The stores were chosen for our project because as a separate facility it had been neglected and fell well below the standard of our manufacturing area,” says Managing Director Bob Reynolds.

Concord then decided to introduce a kanban system with subcontractors so that results could easily be measured via QCD – Stock Turns and Delivery Schedule Achievement. (A kanban system is a way of achieving Just-in-Time production.)

The team found a high proportion of the stock was as finished goods, with maximum added value. In addition, the level of stock held for smaller customers was very high in comparison to their turnover. Manufacture and distribution was controlled by an inflexible ‘push’ system from internal manufacture, through finishing subcontract and then distribution. In addition the stocking of material at subcontractors allowed them to overproduce, possibly using material for non-critical components creating a shortfall on critical work.

To solve this problem the team decided to create a simple ‘pull’ system to ensure that the correct parts were made when they were required with a minimum stock level. The main distribution area was reorganised, creating space for a WIP storage area and a finished goods storage area.

Each of these areas can hold two batches of a particular part. A signal card travels with each batch of parts. When a customer draws a batch of parts from the finished goods area the card is taken and placed on a WIP board. This releases a fresh batch of material from the WIP storage to subcontract and subsequently the release of the next batch of material from manufacturing to the WIP stores. The card is placed with this batch and remains with it throughout the system.

Concord has seen real results from their activities:

- Stock turns have risen by 15%.
- Concord can tightly control the flow of material through the subcontract finishing and distribution area. They now aim to cascade the ‘pull’ system back into the manufacturing area of business.
- Increased customer satisfaction has helped Concord win new business.

## MEASURE 5:

# Overall Equipment Effectiveness

### WHAT IS IT?

Overall Equipment Effectiveness (OEE) measures the availability, performance and quality of a process.

### WHAT DOES IT DO?

The OEE measure shows how well the business is utilising its resources, including equipment and labour.

### MEASURING OEE

OEE is calculated by combining three elements:

- 1 availability
- 2 performance
- 3 quality.

You need to understand the level of each element, as well as knowing the OEE value. Comparison of the three element figures provides a focus for improvement.

- 1 **Availability** – expressed as a percentage, compares the planned and actual time of the process run. An example of an improvement in availability is the elimination of unplanned down time, which interrupts the flow of production and customer delivery.
- 2 **Performance** – expressed as a percentage, compares the actual and ideal output achieved during the running of the process. An improvement would be returning the cycle time of the process back to the ideal design specification of the equipment.
- 3 **Quality** – expressed as a percentage, compares the number of good parts made against the total parts made. Quality improvements include reducing rework and scrap generated by the process.

$$\text{OVERALL EQUIPMENT EFFECTIVENESS} = \text{AVAILABILITY \%} \times \text{PERFORMANCE \%} \times \text{QUALITY \%}$$

UNIT: OEE expressed as a percentage

“The process didn’t stop when the Industry Forum Engineers left either. It gave us the impetus to continue working on other areas highlighted by the activity. We were also left with some skills, techniques and people now familiar with the change process to continue making improvements.”



Name of company: **Jotun Paints (Europe) Ltd**

Location: Lincolnshire

Size of firm: 145 employees

Website: [www.jotun.co.uk](http://www.jotun.co.uk)



## Jotun Paints used Overall Equipment Effectiveness (OEE) measurement to reduce production backlogs and improve productivity.

Jotun Paints is one of the UK's leading manufacturers of paints and coatings. Its Flixborough site in Lincolnshire produces a range of marine paints for ship hulls.

During the summer months the company found that demand was exceeded its manufacturing capacity, which meant a large backlog of orders was developing. Rather than immediately invest in new capacity, the management team decided to investigate if it could increase production using the company's existing assets.

Jotun contacted PICME, a government-funded resource dedicated to improving process manufacturing. PICME engineers joined Jotun production operators, supervisory staff, a planner, an engineer and a technical manager in performing an OEE analysis of the production process.

The team identified one part of the production process, dissolver 218, as a significant cause of the backlog owing to downtime and a significant variation in batch cycle time. Using problem solving techniques, the team eliminated the main causes of downtime and reduced the cycle time variation by producing a standard method of working and asking operators to record their achieved batch cycle times.

This approach yielded a significant improvement in output over a short timescale. Encouraged by the tremendous success on this dissolver, the team went on to apply the same techniques to other dissolvers on site.

The production output in the problem area, dissolver 218, has been increased by roughly a third in the space of only three months – resulting in an increase in OEE from around 60% to 80%.

By applying the lessons of the analysis to other areas of the business, the team has also been able to meet another key management objective: to reduce the impact of returned product on financial and manufacturing performance

This success has helped raise expectations in all area of the business from production to sales, supply chain, organisation and tidiness. The principles that the team developed are now helping operators site-wide to work more efficiently and in a cleaner environment.

Process Manager Ben Parsley is enthusiastic about the changes and the way they were implemented. "Being able to measure the improvements not only shows that you are heading in the right direction," he says, "but it also encourages both the team and the rest of the employees that progress is really being made."



## MEASURE 6:

# Value Added Per Person

### WHAT IS IT?

Value Added Per Person (VAPP) is a financial measure that relates the number of direct people involved in the conversion process to add value to the product.

### WHAT IS IT USED FOR?

The VAPP has a direct impact on the costs associated with a process and shows specifically how well people are used to transform materials into the finished product.

- Output value is the sales value of the unit after production.
- Input value is the value of the raw material unit before production.
- Direct employees are those employees without which the production process cannot operate.

### MEASURING VAPP

The VAPP measure allows the production process to be controlled ensuring the maximum difference between output and input values. The output and input values reflect the difference between the final value of the end product and the value of raw materials and services used. An example of a VAPP improvement is absorbing up or down stream processes into the cell or factory while still maintaining the current number of direct employees.

$$\text{VALUE ADDED PER PERSON} = \frac{\text{OUTPUT VALUE} - \text{INPUT VALUE}}{\text{NUMBER OF EMPLOYEES}}$$

UNIT: £s per person

“The Industry Forum project demonstrated top level commitment to world class manufacturing within the company. The right people were released from their day-to-day activities and shown how to focus on root causes of our problems and implement permanent fixes.”



Company: Lander Automotive Ltd

Location: Birmingham

Size of firm: 500

Website: [www.lander.co.uk](http://www.lander.co.uk)



Lander Automotive specialises in the design and manufacture of seating mechanisms and tubular products for the automotive industry.

The machines used for manufacturing structural tubular components were spread around a machine shop, causing a wasteful production flow. There was too much inventory and transportation of parts because of batch production techniques operated at these machines. Stillages were used to store and transport parts between processes, and overtime was needed to satisfy demand in this area.

Three or four operators ran the process on a three-shift pattern. After assessing the process, the team identified a number of ways to lessen waste that would improve the Value Added Per Person measure.

An Industry Forum MasterClass team was created to address structural tube production. Firstly, it carried out a 5C activity: clear out, configure, clean and check, conformity, custom and practice. This ensured the work area was clear of unnecessary items and organised more effectively.

Secondly, the cycle times for a tube at each process were measured, and the degree of imbalance between the processes calculated. The team then conducted a comprehensive waste elimination activity. Where possible, jobs were combined to use operator waiting time during automatic machine cycles. This released one operator to do other work. An ideal balance was then designed by the team to distribute the work evenly among the remaining operators.

This identified further operator capacity, which allowed inspection and packing to be added to the end of the new cell.

Using the new balance a cell was designed to bring processes closer together allowing single piece flow. This was essential to eliminate transport and double handling waste identified in the process. The team used full sized cardboard templates, carried out process simulations and involved other plant operators throughout. They proved that the new combined jobs would be effective before any machines were moved.

- VAPP increase by 118% by the end of the three month programme.
- Work in progress reduced by 95%.
- Throughput time reduced by 93%.
- Lead-time reduced by 24%.
- Floor space reduced by 28%.
- Walking distance reduced by 25%.
- The need for a pump truck was eliminated. Parts are now passed between processes in the cell using gravity conveyors.
- Operators now stand at their machines rather than sit. Although unpopular at first, operators commented that they found this more comfortable when reviewed at the end of the programme.

## MEASURE 7:

# Floor Space Utilisation

### WHAT IS IT?

Floor Space Utilisation (FSU) is a measure of the sales revenue generated per square metre of factory floor space.

### WHAT IS IT USED FOR?

This measure relates the value of the factory space to the generation of sales, and demonstrates how effective use of space can reduce the fixed cost element of the unit.

### MEASURING FSU

The FSU measure can be applied at cell level or across the whole manufacturing site for internal benchmarking. High fixed costs, such as factory space, are not usually desirable and capital decisions that require expanded buildings can be expensive. So there is generally a strong desire to minimise the use of space taken up by the manufacturing process.

In order to achieve an increased FSU value the floor space has to be reduced. This often means rethinking a process layout and eliminating inventory to reduce the necessary space to the minimum.

$$\text{FLOOR SPACE UTILISATION} = \frac{\text{SALES TURNOVER OF MODEL AREA}}{\text{SQUARE METRES OF MODEL AREA}}$$

UNIT: £ per m<sup>2</sup>



“By linking the process, we improved floor space utilisation and reduced work in progress.”



Company: *Steering systems company*

Location: Birmingham

Size of firm: Around 350



This West Midlands based business specialises in steering wheels and other related PU and leather trimmed interior components.

The aims of the Industry Forum MasterClass team were to drive out waste in the foam moulding and assembly processes, using techniques which could be cascaded through the rest of the factory, giving sustainable improvements in both the efficiency and visual impact.

“We needed to find space within the existing factory to install a new magnesium die-casting foundry, and expand our leather trimming department,” says the managing director.

The team concentrated on the manufacture of the ‘cubby box’ lid for the Land Rover discovery. Although not one of the largest volume cells in the plant, it was a small, self-contained manufacturing unit, in which the process improvement Building Blocks and tools could be used to good effect.

The layout and organisation of the cell gave a poor visual perception. The team learnt to effectively identify and countermeasure the wastes in material handling, WIP and the balance of the line.

“This program gave everybody a focused method by which they could contribute towards the common goal,”

The team carried out a diagnostic in the cubby box cell, which involved a thorough examination of the manufacturing processes and calculation of the seven measures of quality, cost and delivery. This provided a focus for improvement.

“Space was wasted by processes not being linked, which leads to excess Work In Progress and double handling,” says Chris.

After capturing the current situation, the team members proposed and agreed a new layout of the cell, and a change from batch manufacture to single-piece flow. The company team took one of the process improvement spirits to heart - “Do it now, no excuses!” – changing the layout, painting the floor, improving the workstations and configuring all the tools and equipment, while still allowing production to continue on the afternoon and night shifts during the workshop week.

- Floor space utilisation increased by 45%.
- Usable space was made free for other products.
- Stock Turns increased by 83% – less money was tied up in Work In Progress.
- Better communication and faster feedback improved quality and teamwork.
- Two operators (28% of manning) were released to work in other cells to cope with increased demand and new products.

# Further help and advice

Achieving best practice in your business is a key theme within DTI's approach to business support, providing ideas and insights into how to improve performance across your business. By showing what works in other businesses, we can help you see which approaches can help you, and then support you in implementation.

## **ACHIEVING BEST PRACTICE IN YOUR BUSINESS**

To access free information and publications on best practice:

- visit our website at [www.dti.gov.uk/bestpractice](http://www.dti.gov.uk/bestpractice)
- call the DTI Publications Orderline on 0870 150 2500 or visit [www.dti.gov.uk/publications](http://www.dti.gov.uk/publications)

## **SUPPORT TO IMPLEMENT BEST BUSINESS PRACTICE**

To get help bringing best practice to your business, contact Business Link – the national business advice service. Backed by the DTI, Business Link is an easy-to-use business support and information service, which can put you in touch with one of its network of experienced business advisers.

- Visit the Business Link website at [www.businesslink.gov.uk](http://www.businesslink.gov.uk)
- Call Business Link on 0845 600 9 006.

## **SMMT INDUSTRY FORUM**

Industry Forum has developed a common approach to Process Improvement, based around its products of MasterClass, Supply Chain Group, Team Leader Training and Value Stream Mapping. These are structured programmes, with teams drawn from all disciplines and levels within the host companies, working and learning together under the guidance of expert Industry Forum engineers to undertake and sustain process improvement on the shop floor.

The Industry Forum was established by the automotive industry to drive and support the achievement of sustainable world-leading competitiveness in the UK based vehicle and components industry. It aims to achieve this through practical shop-floor improvements for member companies, concentrating on manufacturing process to deliver tangible results. DTI provides support towards its activities.

Businesses supplying the automotive sector can obtain further information about the SMMT Industry Forum and its company improvement programmes by contacting:

SMMT Industry Forum  
Tel: 0121 717 6600  
Fax: 0121 717 6699  
E-mail: [info@industryforum.co.uk](mailto:info@industryforum.co.uk)  
Web: [www.industryforum.co.uk](http://www.industryforum.co.uk)



## **INDUSTRY FORUMS**

Contact your own industry forum and find out if these measures are being used, or could be used, in your sector.

Best Practice Forum (Tourism, Hospitality and Leisure)  
Hospitality and Leisure Manpower

Tel: 020 8977 4419

Fax: 020 8977 5519

E-mail: [hlm@halm.co.uk](mailto:hlm@halm.co.uk)

Website: [www.bestpracticeforum.org](http://www.bestpracticeforum.org)

Ceramic Industry Forum

Tel: 01782 415 210

Fax: 01782 745 771

E-mail: [sue@ceramicindustryforum.co.uk](mailto:sue@ceramicindustryforum.co.uk)

Website: [www.ceramicindustryforum.co.uk](http://www.ceramicindustryforum.co.uk)

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Tel: 0845 605 5556

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E-mail: [helpdesk@constructingexcellence.org.uk](mailto:helpdesk@constructingexcellence.org.uk)

Website: [www.constructingexcellence.org.uk](http://www.constructingexcellence.org.uk)

Construction Equipment Association

Tel: 01883 334 499

Fax: 01883 334 490

E-mail: [cea@admin.org.uk](mailto:cea@admin.org.uk)

Website: [www.coneq.org.uk](http://www.coneq.org.uk)

LOGIC (Leading Oil and Gas Industry Competitiveness)

Tel: 01224 853 420

Fax: 01224 853 429

E-mail: [logic@logic-oil.com](mailto:logic@logic-oil.com)

Website: [www.logic-oil.com](http://www.logic-oil.com)

MICE (Metals Industry Competitiveness Enterprise)

Tel: 0114 244 6833

Fax: 0114 256 2855

E-mail: [enquiries@metalsindustry.co.uk](mailto:enquiries@metalsindustry.co.uk)

Website: [www.metalsindustry.co.uk](http://www.metalsindustry.co.uk)

**PICME (Purpose Industries for Manufacturing Excellence)**

Tel: 01642 430021

Fax: 01642 430025

E-mail: [enquiries@picme.org](mailto:enquiries@picme.org)

Website: [www.picme.org](http://www.picme.org)

**RMIF (Red Meat Industry Forum)**

Tel: 01908 844 710

Fax: 01908 844 302

E-mail: [mif@mlc.org.uk](mailto:mif@mlc.org.uk)

Website: [www.redmeatindustryforum.org.uk/forum](http://www.redmeatindustryforum.org.uk/forum)

**Shipbuilders & Shiprepairers Association**

Tel: 01784 223 770

Fax: 01784 223 775

E-mail: [office@ssa.org.uk](mailto:office@ssa.org.uk)

Website: [www.ssa.org.uk](http://www.ssa.org.uk)

**Industry Forum (Textile and Clothing)**

Tel: 020 7636 7788

Fax: 020 7636 4418

E-mail: [info@industryforum.net](mailto:info@industryforum.net)

Website: [www.industryforum.net](http://www.industryforum.net)

**UK Lean Aerospace Initiative**

Tel: 07887 562 833

Fax: 020 7227 1025

E-mail: [karl.smith@sbac.co.uk](mailto:karl.smith@sbac.co.uk)

Website: [www.sbac.co.uk](http://www.sbac.co.uk)

**GENERAL BUSINESS ADVICE**

You can also get a range of general business advice from the following organisations:

**England**

- Call Business Link on 0845 600 9 006
- Visit the website at [www.businesslink.gov.uk](http://www.businesslink.gov.uk)

**Scotland**

- Call Business Gateway on 0845 609 6611
- Visit the website at [www.bgateway.com](http://www.bgateway.com)

**Wales**

- Call Business Eye/Llygad Busnes on 08457 96 97 98
- Visit the website at [www.busesseye.org.uk](http://www.busesseye.org.uk)

**Northern Ireland**

- Call Invest Northern Ireland on 028 9023 9090
- Visit the website at [www.investni.com](http://www.investni.com)

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