

Benchmarking and its importance in Bakery Manufacturing performance

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The aim of the paper today is to give you an outline of how benchmarking can be used as a tool for continuous improvement within manufacturing.

- The three functional areas used are:
 - Business measures

Benchmarking

- The Process

- 3 key functional areas
 - Business Measures
 - Human Resource and Training
 - Factory skills
- Methodology
 - Pre-filled questionnaire
 - Visit to factory site
 - Review of questionnaire with senior management team
 - Factory tour
 - In depth questioning of skill areas in situ
 - Review meeting with senior management team
 - In depth report plus action plan within 3 weeks

Adapted from Whieldon & Whieldon

- Human resources and training and
- Skills within the factory
- The methodology is:
 - A pre-filled in questionnaire
 - Site visit
 - Review with the senior management team

Factory tour to put into context the manufacturing operation and establish key areas to carry out skill interviews

The key performance indicator used to start the benchmarking process is called 'Overall Effective Efficiency' (OEE) and is calculated as follows:

Overall Effective Efficiency

World Class Manufacturing Standard 86%+

- Availability 81%
 - 3.9% changeovers
 - 15% downtime
- Performance 87%
 - 87% output rate
- Quality 98%
 - 98% right first time

81.1% x 87% x 98%
= 69% OEE

Adapted from Whieldon & Whieldon

Availability: This is the amount of time left for production after changeovers and downtime have been deducted from planned running time

Output Rate: This is the amount of production achieved against standard output rates in the hours available for production after deducting changeovers and downtime

Quality: The measure we use is 'right first time'. The reason that we use this and not a yield or waste measurement is that in certain industries you can rework products.

World-class manufacturing standard is considered to be 86%+. In the UK we have an average OEE of 69%. Other key performance indicators measured are:

Business Measures

- Other Performance Indicators

- Yield
- Order satisfaction
- Average age of processing plant
- New product development
- Improvement in tonnes per man hour
- Improvement in added value
- Improvement in turnover
- Improvement in profit

Mike Widdicks Associates

Human Resource and Training Measures:

Human Resources and Training Measures

- Staff turnover
- Absenteeism
- Vocational qualifications
- Educational qualifications
- Training spend
- Types of training
 - Health & Safety
 - Hygiene
 - Processing
 - Quality
 - Engineering

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We look at staff turnover, absenteeism, qualifications, training spend and the types of training to see if the way in which the company carries those out has any effect on manufacturing performance. That is the second part of our company profile.

Manufacturing Skills

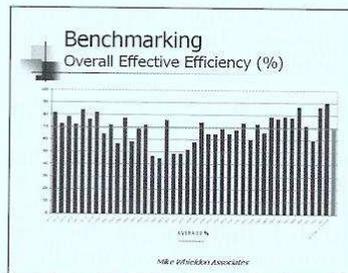
- Operators
 - Mixing
 - Forming
 - Heat treatment
 - Packaging
- Maintenance Engineers
- Line Managers/Team Leaders

Mike Widdicks Associates

The final part, and one that is often ignored, is to look at key skill areas within the manufacturing operation: the engineers, the line managers or team leaders and operatives. We have developed a matrix where we can measure their skills by observation and questioning techniques to arrive at a skills percentage.

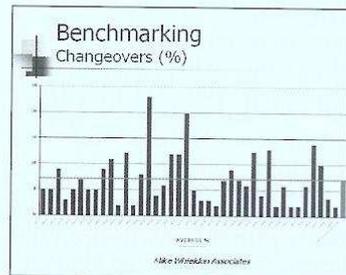
This gives us the data to produce a company profile, which can be compared against our database. At each benchmarking visit, the company receives a full profile on all the measures. An action plan is created in the form of recommendations to take the company forward on a continuous improvement program.

This section of the paper presents a selection of data.



Overall Effective Efficiency: You can see from the 40 UK companies that the average is just over 69%. There were three companies at world class manufacturing standard in this study. There are various things that affect performance, and I will go through some of those measures. You can see that there are several companies that we visited that have manufacturing

performance below 50%. We will go into some of the reasons why this is so, and why other companies have made improvements.



Changeovers: Some companies lose nearly 25% of their manufacturing opportunity on changeovers and the length of time they take. Other companies that have got batch production lose very little time. Let me give you two examples:

A manufacturing company realised that the type of products that they were making meant that changeovers were going to be a fact of life. So they worked out how they could be most efficient at changing over. They can change over an entire manufacturing line – from mixing to scaling, to packaging, to sealing, to despatch – in less than eight minutes.

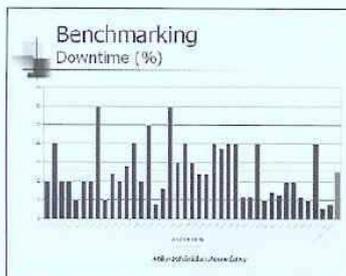
The whole thing has been done because they have re-engineered. All the change parts are alongside where they are going to be changed, on frames. There is a shadow board with all the tools that need to be used, and all the conveyors and the lines that hold on the conveyors are colour-coded so that they just change to the colour wanted. All the operatives are involved in it. It is a team effort, everyone is involved.

They have also looked at re-engineering in the following ways: any areas that have screws or nuts and bolts that require removing have been replaced with simple spring clips thus considerably speeding up the changeover process. Also, in some

companies where they have filling heads these have been redesigned so that they simply clip on or off like the mixing blades on a Kenwood mixer.

The reverse of that is one of those companies with the lowest OEE and with the highest changeover you will see. There the supervisor says, "Changeover!" and all the operatives walk off and wear out a pack of cards. The engineer comes in and tries to find all the change parts; he puts them on and the changeover takes an hour and a half. When I was there, it took slightly longer, because I got talking to the engineer until I was dragged away and told that he would keep it going for two hours if I stayed with him.

So there are the two contrasts – what you can do if you sit down and say "This is what we are going to do" compared with "Let's just let it happen".



Downtime: It is important to remember that in those 40 companies the average downtime is about 12%. The average company is losing 12% of its available manufacturing time to downtime and downtime can be lack of product, mechanical, electrical, lack of people, etc. You can see that there are some pretty horrendous ones there as well.

One of the important things we found in our study is that people don't measure downtime accurately; most companies don't consider a downtime incident until it has taken more than 10 minutes. I can give you a couple

of examples of companies that have looked at this, and how they have improved performance:

Company number one was in the business of putting milk into NRCs (non-returnable containers, the plastic containers found in the supermarkets). They had problems with their output rate, but they were only measuring downtime if it was more than 10 minutes. We advised them to have a close look at this. They discovered, to their horror, that 90% of their downtime and low output rate was caused by stops of less than 5 minutes. When they investigated it in depth they found this: the handles on the containers had to be in the same place when going to the filler head. If a handle was turned though 180, it created a jam. They realised that the workers who were feeding these plastic containers on lacked motivation and had realised that if they wanted a quick break, they could turn a container the other way around.

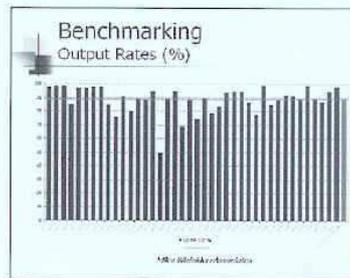
So they completely reviewed the area and put a supervisor there to control adequate breaks for the operators. Downtime has been dramatically reduced and they have improved their output rate by 10%, simply because they bothered to measure the downtime properly.

The next case is a sugar confectionery company with vertical flow pack machines that use Teflon strip heat sealers. In this particular company, they decided that one of the key downtime factors was that these seals needed replacing at least twice a week, because they ran seven days a week, 24 hours a day.

They took it to stage one: they got their operators to change these things, but they did not take it to the further stage. The operator would shut the machine down and take the seals off, then wander off to the engineering workshop for 10 minutes to collect the next set.

We found out from the company that these packets were valued at £1 (manufacturing cost) and then calculated that losing 400 packs off each machine in each 10 minutes' downtime, twice a week, with six machines, came to about £4,800. Multiply that by 50 weeks of the year. I said, "It would not cost a lot, would it, to have a spare set alongside?" They have done that and they have improved their output considerably and their bottom line.

Eliminating downtime makes a great deal of difference.



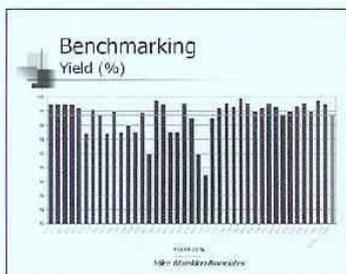
Output Rates: This is mixed up with downtime, in that if you look at some companies with low output rates, it's fairly obvious that if they did a downtime study, they would find that the low output was being caused by minor stops on the line.

Line balance is also a key area. Many of the manufacturing lines observed do not have balance in that each part of the process has different output rates. Many companies base their rate on the highest piece of equipment and therefore this rate cannot ever be achieved. A company's maximum output is based on the slowest piece of equipment.



Right First Time: There are a few people who have real problems on their quality issues and they tend to be the ones that have the high changeovers. A high number of changeovers do tend to lead to problems with getting it right first time. I can give you an example of a company that had a problem with Right First Time. They had a system whereby if the product was not quite right, it was sold as a second. They got a new operations man in, and he said: "I am stopping all this, because people are not taking changeovers seriously. I have got the key; if you have made a mistake, you come and get the key from me." Virtually overnight that Right First Time figure rocketed up.

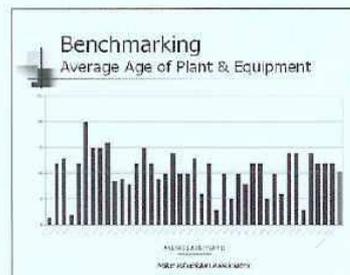
There are issues around some companies that get into the business of selling seconds. It is something that you should really consider in connection with full manufacturing quality as it allows poor quality to be made.



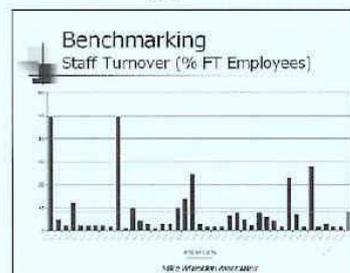
Yield or Waste Levels: There are some extremely low waste levels and they tend to be in the creameries, or liquid milk. There is very little waste, because it can be sent back through the pasteuriser again. Some companies have horrendous problems with waste levels in the manufacturing operation. In one of those companies that made fancy handmade Italian-type products, we suggested that perhaps they could do something with the waste, not sell it as a second. Now Marks & Spencer's and Waitrose sell crispy breads with olive oil which is actually a

waste product – the misshaped ones that have been cut and dried. The only problem is that the misshaped sell better than the originals, so the company is at the stage of having to screw up to make the numbers that they want. But it was a dramatic way of reducing waste and improving profitability.

Also, many companies do not control their levels of 'giveaway'. Those that do, have installed software programs and in many cases achieved 1% saving on turnover which goes straight into the bottom line.

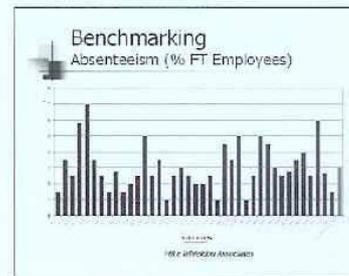


Average Age of Plant and Equipment: It is important to note that the ones with the best OEEs and the one on the left-hand side have got some of the oldest kit and some of the best performance. The real problem is that when people are buying new equipment, they are not putting in the training programs and they are not making sure that they have got the skills base to be able to maintain that new equipment. So new equipment does lead, in some cases, to poor manufacturing performance.

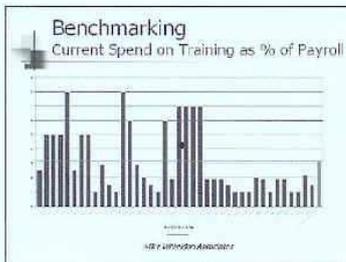


Staff Turnover: The interesting two have over 50% staff turnover. When we asked them to analyse this, they had not realised that they had 50% staff turnover, because they were not measuring it. They had wondered why their training budget was all spent on new starters so I think that explained it to them.

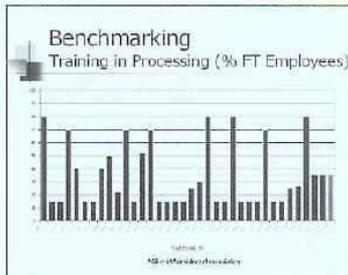
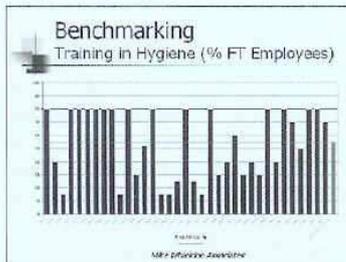
The reverse is the fact that in some companies, because staff turnover is very, very low, you get a profile where the workforce is all ageing together and it becomes very, very difficult to get in a new skills base if you are going into new technologies.



Absenteeism: The reason I have put that slide up is that if you look at the three with the highest absenteeism rates, they are the three companies that pay attendance bonus. So if your human resource people say that they want to take more out of your manufacturing cost by paying people an attendance bonus, quote that to them. I do not know why; the only reason I can think of is that people who oversleep one day will realise that they are going to lose their attendance bonus for the month, so they might as well have a few more days off. But it is a fact that those companies that have a high score here do have attendance bonuses in operation. The key to controlling absenteeism is to have a clearly defined and enforced policy which includes return to work interviews.

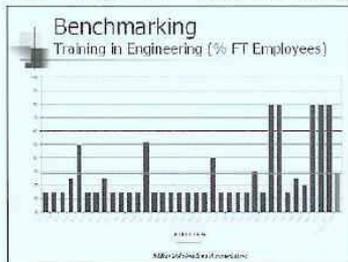


Current spend on training as a percentage of the payroll: This is probably the most controversial finding in this particular study. If you try to correlate high training spend with good manufacturing performance, you will fail abysmally. We found that companies were wasting their money because they were putting in NVQ programmes with no thought whatsoever. We went into one company in which 85% of the workforce had gained NVQs. I presumed it must have done wonders for their bottom line, but I was wrong. It had cost a lot of money and the Managing Director felt it was a complete waste of time. That needed investigating. We found that no-one had created a matrix and established what the operators needed to know in order to carry out their jobs effectively. We recommended that the company establish a skills matrix, map everybody against that matrix and then work out what training programmes were actually needed. This training is targeted at key business needs.



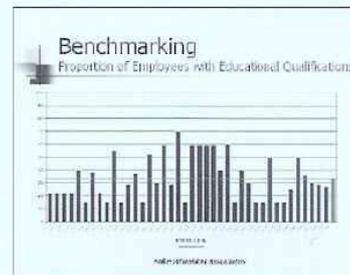
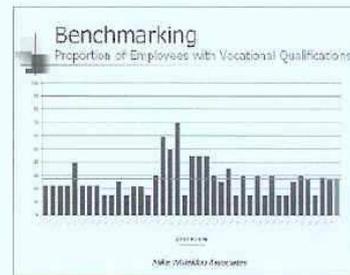
You may decide to use NVQs, or to use your own in-house. Some of the best training I have seen has been in-house, using standard operating procedures to make sure that people in the workforce have the skills to carry out the task they need in manufacturing operations.

If someone offers to put all your people through an NVQ at no cost – accept by all means. But it will not improve manufacturing



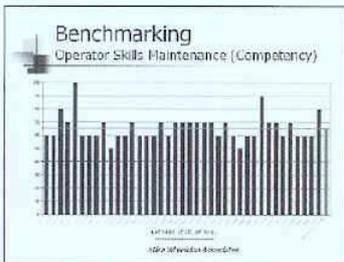
performance – this is the important message.

Training in Engineering: That comes back to equipment and enabling engineers to have the appropriate skills to maintain equipment. There are a lot of companies with good OEEs; they are the ones that spent the money realising that engineering skills are a key part of manufacturing performance. They have got good manufacturing results from it.



The position has slightly improved over the six years that we have been doing this study. There are more employees with vocational qualifications. But again, the two companies with the highest numbers have got some of the worst OEEs, because they mis-spent their training budgets.

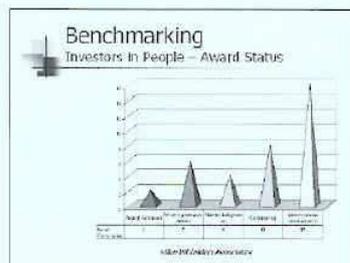




This probably again, emphasises engineering. One of the major things that you look at may be that the average engineer in the UK food factories is only about 65% competent. There are gaps in their skills, knowledge and understanding when it comes to maintaining equipment. Companies that have spent money on training have improved those competencies. The companies that are above average are the ones that have got decent manufacturing performance. Some of them that have spent the money on engineering have only just recently spent it, so it will be important for us to go back to those companies in about a year's time to see if it has actually improved their engineering skills base and, therefore, manufacturing performance.'



Finally, **line managers:** We are talking about first-line supervision – line managers and the skills that they have in order to carry out their functions. Some companies have spent a great deal of money on developing their line managers. They work on the principle that it is very difficult to recruit people, so they should develop from within. This does have an effect on manufacturing performance. There is progress – and progress would be much quicker here than in Japan. In Japan, most people join a company for life. The average graduate or graduate from technical college would expect to be doing ordinary jobs for ten years before they would even be considered for the first-line supervision. I do not think that would ever operate in the UK.



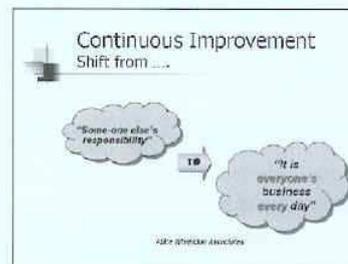
Whether you are a believer in Investors in People or not, one of the disciplines of Investors in People is actually to create that matrix; to create a situation whereby you know exactly the skills and the development that you need to do for your people. In that 40, only two have gained the award, and 16 have indicated that they need to know more about it.

Six companies are working towards the award and four have started but given up. There are a lot of issues around Investors in People – the paperwork and the involvement. But the requirement of actually sitting down and

working out what you want is a very good discipline. It is important to note that those eight companies that are working towards it, or have achieved it, all have an OEE above the UK average.

I hope that this outline on the benchmarking methodology used, shows how it forms part of a continuous improvement program. Once benchmarked, you know where your company compares with the 200 on the database and the action recommendations produced form a basis for a way forward.

Finally,



*Question: Paul Catterall
Have you come across productivity bonuses and what are your views on them? Do they work?*

Answer - I've seen it occasionally when they've been linked to performance bonus, to attendance bonus and I've not seen them work very well. The way it works best is if you've got a total team approach and you are carrying out an appraisal of that team maybe every three or six months and that appraisal is based on performance that can lead to increased salary, then that seems to work but if you pick it on individuals then you're building resentment that some people seem to think that somebody is doing better than others, also you find, where you've got a total team approach absenteeism is very low

because what happens then is the team is a fixed number and if somebody isn't there then you have to work one short and that's very quickly from: I'm sorry our friend is sick, to: you better get rid of them before we do something about it. So that tends to concentrate the mind wonderfully but it's all about if you try and do it on an individual basis that can lead to resentment. If it's a total shift package and that team is performing, the company 1 was telling you about with the colour coding and everything, the team itself decides who has the training and you see the training records when you go in and it's not a team leader, he's called a team coach and there's a satellite workshop.

Question: Cary Entwistle, Derby

Have you ever come across, in any business, them having to change the culture, the way that they operate, the philosophy of the business itself.,

Answer - Yes, I'm probably, again, going to offend a few people. I can usually tell when I walk into a factory what I'm going to find and this is particularly true in Australia. If I walk in and the environment is very dull and there are six pictures of the predecessors on the wall then I know there's going to be difficulty to change the culture in that organisation. The real problems are where there has been a lack of staff turnover and a lack of investment and they've always done it that way and I've faced that a couple of times when I was in industry. "We've always done it that way", well common sense tells you to do it a different way and I remember an old factory manager sitting in the corner, smoking a cigarette saying "Mike, remember sense isn't always common" which is a very good thing to remember and effectively

if you are going into a new environment you've got to say to yourself what really needs to be changed and same with benchmarking, we give an action plan with maybe ten things to do, you can't do ten things at once. You've got to say: right, what's the quickest win and you go for that one. Then everybody sees that's successful, lets go for the next one and it's the same with cultural change. You may need to do massive change but what is the easiest bit to start with first, but it will always be "we've always done it, that way or we tried it that way and it didn't work" so we went back to doing it our way.

Question: Tony Barcroft, Newcastle

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Given that you've travelled an awful lot benchmarking in other countries and companies, is there anything that strikes you as a really big difference between the largest company in the UK that would be our biggest opportunity?

Answer - The biggest opportunity is also the biggest threat. The biggest threat to food manufacturing in the UK, and I'm probably going to upset the people from Asda and Sainsburys, is the unique buying power that the major retailers have in the UK compared with anywhere else in the world. It is unique and that's why companies have changeovers, but that is your biggest challenge. If you know you've got to do changeovers, if you can actually trim that changeover time down, that money is going straight into your bottom line because you're not having to work overtime to create the products. You can create a better customer service; all the major supermarket groups will score you on how good your service has been for the last month, three months. and six months. Now if you can suddenly

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start looking at some of these improvement programmes cutting out downtime, reducing the amount of time it takes to changeover a line, look at the way in which you're already building into your costings waste, look at eliminating that, all those are win wins because they're not costing you any money they're just going straight into you bottom line which gives you a competitive edge which means when the major retailers come along and say we want to knock 10p off this product you might grimace, but deep down "that's not going to hurt us" because we've already made more than that.

Question: Can you give some examples of people you have already done benchmarking to, what have they been like when you went back a year or two later?

Answer - I suppose one of the classic examples was a company out in East Anglia where we looked at them and I have never been into a company that had so many layers of management in my life. It's a bit like the Civil Service really and National Health, there was an Assistant to an Assistant to an Assistant like you see on the big film titles, it just went on and on and on. We effectively said, we upset people, we said how do you ever make a decision in this business and I suppose we were lucky in that the two guys who were running the operation were new so they'd actually said lets be benchmarked, lets see where we are and we can improve. So we said you need to flatten the structure, why do you have a dozen people walking around doing quality control, empower the workforce and say you are now responsible for your own quality.

Train them to do that. It's the same with waste, there's software on the market we put **into** that company that controls give away and does lots of other things and they saved 1% on giveaway, so in one year they **ripped** out £700,000 of cost on that site, simply by saying wait a minutes, why are we doing it this way. All we do is we act as a

catalyst, we're the person coming in and looking at the company profile and saying based on what we've seen elsewhere we think if you do this, this may help and that particular site in less than a year ripped out £700,000 worth of costs. Now the trick would be

how do you rip out £700,000 next year because everyone will want that. In my opinion they did it all too quickly. Suddenly they were real heroes and if they only ripped out £400,000 next year they'd failed, but that's the sort of thing you can do

