Business Process Reengineering : Ingersoll-Dresser Pumps

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Introduction – Vice President

The Company

Ingersoll-Dresser Pumps is a £600m business, jointly owned by Ingersoll-Rand and Dresser Industries, combining the two companies' pump manufacturing businesses.

The company is divided into two business areas. The engineered pump business is focused typically on major capital projects for, say, the oil industry, where products are heavily engineered to order. Industrial pumps, although offered from a wide range of options and often customised to meet particular customer requirements, are predominantly pre-engineered.

The UK operation comprises two sites, at Gateshead and Newark. The Newark business in fact incorporates three previous pump manufacturing units, the largest of which is the former Worthington Simpson company established at Newark in the last century. The business is controlled within IDP's world-wide engineered pump operations for geographical reasons although its products are, in fact, industrial pumps.

The Newark facility produces around 10,000 pumps per annum on 5,000 customer orders. The average sale price of pumps is just over £1,000, although there is a very wide spread of price and size. The primary markets for the company's products are chemical companies and general industrial business which each account for around one quarter of total output. The remainder of the business is shared between water supply, power utilities, food and drink manufacturers, the oil industry and commercial construction. In each sector IDP's customer may be the end user (e.g. ICI), a contractor (e.g. John Brown) or a supplier of industrial machinery which incorporates the pump.

In addition to the pump business the company has a significant spares operation with £10m sales of both current and obsolete product parts. 20,000 parts sales orders are handled each year. The business also has a service operation which repairs and refurbishes pumps of all makes at service centres throughout the UK.

Any IDP business worldwide can sell product from any plant so Newark may take orders for pumps made at any other facility - several in the US, others in Germany, France, Italy, Austria, Spain and elsewhere.

The business has at any time about 2,000 live customers. There are a further 4,000 on file who may become active once again at any time. Within this there is a core of major customers who regularly feature in the company's 'top ten'.

Export business accounts for 35% of sales, of which the majority is within Europe.

The Newark facility employs 430 people, of whom 220 are direct.

The Products

The company's products can be sub-divided into two major areas: double suction and end suction. Double suction units are larger, usually with more engineered content and supplied on lead times of between 8 and 24 weeks. Double suction accounts for about 10% of sales by unit volume, 20% by value. The major product family in this area is the LNN water pump.

End suction pumps are usually smaller, with less customisation, and supplied on shorter lead times. The company's flagship product, the CPX chemical process pump, is supplied in standard configuration on a 4-week lead time. Where further engineering is required to meet a particular application this is extended to 8-10 weeks.

The Manufacturing Processes

The manufacturing processes comprise foundry, machining, assembly, test and paint / pack.

The foundry undertakes work for its own external customers as well as for the pump business and is moving to a position of being a stand-alone business in its own right.

The business has in recent years moved to the cellular manufacturing approach. Machining and assembly operations are carried out within 'business units.' In each product area there is a unit manager responsible for both machining and assembly. Within each machining area operations are carried out in cells covering the major components so there are cells for casings, impellers and shafts. As part of the move toward cells, the company outsourced many components which either did not fit into the cells required for these major items or which required specific operations which could not be performed in-house.

Most components, and all major items, are machined strictly to customer order. The only exception is on specific ranges of 'fast track' products where, to eliminate the need for finished pumps held in stock, a special build area has been established to assemble to order from stock components. These components are stocked on a kanban basis.

Although, as described below, the business systems were recognised to be in need of improvement, the physical aspects of production had, through the cell project, reached a very high standard. Component lead times had been substantially reduced from several weeks in the case of pump casings to less than one week other than for very large or complex variants. One of the major points made when the consultants arrived was that the manufacturing processes themselves were first class (we were already a DTI Roadshow reference site for the cell approach) but that they were served by a system based on the old way of doing things. The model of the business inherent in the system was no longer accurate.

Background to the Project

Shortly after the formation of the UK entity, three independent operations were drawn together onto the same site as part of a world-wide rationalisation of the pump businesses in a shrinking market. In order to achieve the savings and benefits of this amalgamation it was essential that harmonised processes, procedures and systems be achieved as soon as possible.

In addition, it was recognised that both UK plants were in a position to benefit substantially from investment in business systems. Newark's core system was based around software written in-house over a period of 23 years on an ICL mainframe. The elements of the system were fragmented, having been developed at different times during this period using the database, file and programming tools available at each stage of its evolution.

In other areas the site had actually been very successful. CAD was implemented some years ago and was allied to Engineering Data Management, which had in turn been integrated with an order handling system on a PC network for various ranges of coded, or configurable, pumps. This system provided a series of questions on the duty and service required of the product and through an 'expert system' generated a specification in terms of a 'polycode' which would then be broken down into bills of material recognisable by the mainframe for planning purposes. Another development had been the introduction of Shop Floor Data Collection which used DNC links to the cells to record production progress.

It was decided that the Gateshead site would proceed with the introduction of a manufacturing system developed around a core proprietary system at a sister plant in the United States. This system is heavily focused on engineer-to-order products and is in fact named EPIC, which stands for *Engineered Pump Information and Control.* As such it was decided that the fit of this system at Newark had to be examined very closely. In any case it was recognised that the introduction of a new system during the period of bedding down the new business would not be a sensible strategy. Furthermore, if EPIC were to be chosen as the future system for the site it made good sense to implement, in major part at least, at Gateshead prior to commencing at Newark.

We therefore decided that it was appropriate to carry out a full study of the business processes within the operation and establish the future way of working prior to any attempt to introduce new systems. We needed to use this time to:

- establish a full, shared, management understanding of all the business processes of the 'new' Newark entity.

- achieve a substantial number of wins in terms of process improvements in the short to medium term.

- formulate a clear philosophy of how we would manage the manufacturing activity over the longer term.

- prepare the business for the introduction of new business systems - using the future vision as the basis of system requirements.

We decided to enlist outside assistance for the initial phases of review and re-design. Consultants generally produce analyses which managers receive with comments like "well, we knew we did that. We just haven't had time to fix it" or "that's pretty obvious." The fact is that we, as managers, are blind to the obvious; we don't get involved in the detail. We left it behind when we became managers. The people who we manage can't or won't see the whole picture - they either do it that way because that's the way its always been done, or they've tried to change it so many times without success that in the end they gave up.

Situation When the Project Started

The Newark site was in the confused and shell-shocked state that arises from a massive reduction in the labour force and the consolidation of two businesses as one site. The new management had a clear idea of the business direction and had some very sound foundations on which to build. What it did not have was a clear picture of the current processes and how these had been affected by the reduced manpower.

Business Process Reengineering 'Unwrapped'

BPR Defined

Hammer & Champy define BPR as

> *'...the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance such as cost, quality, service and speed...'*

BPR Objective

The overriding objective is to achieve a **step** change in performance. This is in stark contrast to the 'continuous improvement' approaches of several other methodologies.

Performance improvement relates to internal efficiency and competitive advantage. Internal efficiency is achieved by examining how we can run the business with fewer hand-offs, barriers, formal communications and less waiting time. This is the O & M view of the business process. Competitive advantage often involves working with the customers on assisting them with their business so that you can both be more effective. The result of this is competitive advantage for you both.

BPR Methodology

There are **seven** identifiable steps in a BPR project - although every consultancy draws different boundaries and describes these steps in different ways as they struggle to differentiate their services (i.e. their ways of delivering BPR). In generic terms these can be described as:

- Project Kick-off

- Document the Current Processes

- Establish Key Performance Measures

- Develop and Test Future Processes

- Prioritise & Commit to Future Processes

- Plan the Implementation

- Implement the Future Processes

A good project kick-off is important to getting a BPR project 'off on the right foot'. It includes setting expectations, selecting and releasing team members, communicating to the organisation, briefing the team and providing the structure to support and manage the project.

Having established what the processes are, and which are to be addressed by the project, it is necessary to establish a common view of the 'as is' situation. This involves 'walking' the current process and flowcharting it.

It is important to identify a modest number of performance measures (usually of cost, quality, service & speed) which will enable the process-oriented business to be successfully managed and benchmarked.

Developing and testing the future process starts with the crucial step of developing the 'vision' for the future process and in particular seeking breakthroughs which would give competitive edge. This is followed by testing out the proposed future process on selected customers and then working out the details of the future process.

The feasibility of some of the proposed changes (both process and non-process related) are then investigated and prioritised. Management must then commit to the processes and their implications.

The implementation must then be planned: the project management approach needs to be agreed, an outline plan established and phased, and the required resources estimated. Management must then commit to the plan and subsequently work out the details.

The final step in a BPR project is the only one, which achieves benefits, i.e. the implementation. This starts with communicating to the organisation the scope of the implementation, the team and the timescales, establishing the project performance measures and subsequently conducting regular project reviews.

Why Do Some BPR Projects Fail?

Many BPR projects never get beyond the internal efficiency stage of process improvement. This failure typically occurs when the company does not spend the necessary time and effort in working with the customers to develop competitive advantage for both parties. This lack of market focus may be because the project started from the wrong point in the management structure or was being done reluctantly at the insistence of a parent company rather than at the instigation of the unit concerned.

Another common problem is the lack of inspired, radical and thorough thinking about future processes. This may be caused by pressure to conclude the project, the inexperience of the participants, or a lack of awareness of what is possible. The result is missed opportunities, i.e. only achieving minor improvements rather than radical process redesign.

Once the exciting element of developing new processes is completed, the relatively boring implementation can be a weak area on BPR projects. Here senior management may lose interest or reduce available resources, resulting in a partial implementation and the benefits not being obtained. An implementation may falter because of a lack of common 'vision' for the future processes; caused by them being dreamt up by a team and not owned by the senior executives, process owners or key staff. On other occasions the top management commitment may be insufficient to implement the less comfortable conclusions.

Another common difficulty is experienced with executives who seriously underestimate the change management challenge posed by BPR. There are social, career and procedural dimensions of the process changes. It is the handling of these human aspects of the changes which is often significantly more complex to manage than the technological changes.

Is BPR Anything New?

The answer is yes and no. The process orientation makes this different from the work that many of 'change agents' have been doing over the years in re-organising, downsizing and rationalisation. It brings a new and demanding approach and some fresh thinking. However, within the scope of its activities it uses many of the skills and methodologies that we have been using in the past years. Well done to Hammer & Champy for coming up with a truly new perspective on an old problem although one has to admire the expert marketing of another TLA (Three Lettered Acronym). It has certainly made them both rich and famous. There will always be some cynics who want to knock it. It has even been said that 'there is nothing new in BPR that wasn't in MRPII'. However, such people may be re-writing the texts after the event!

As we study the articles and books of the BPR 'expert' one comes across many examples of projects which pre-date the BPR expression and were not done with a visible process orientation. Therefore one must suspect that many of us having been doing BPR for some years without realising it. Or are some people re-writing projects to fit them under the fashionable BPR banner?

Are All BPR Approaches the Same?

There is an essential core that should be the same but several of the major players are trying to differentiate their particular way of delivering BPR by tampering with the apparent content. At least one of the major consultancies has tried to fit BPR into its pre-existing framework for consultancy. In their case it is a poor fit but nonetheless enables them to project an apparent difference from the competition.

In the detail there are some approaches that apparently demand heavy consultancy input while others focus the external input into the areas where they are most required and use internal resources to their fullest.

What Tools Should One Use?

There are an increasing number of tools available to assist with BPR. These range from the simplest flowcharting software to the most complex data modelling facilities. Packages have been developed to support different aspects of the process analysis, redesign and modelling. This software can be grouped into five categories:

• Flowcharting & static modelling of processes

• Dynamic modelling or simulation of processes

• Development of application software to support redesigned processes

• Process evaluation

• Workflow automation

The selection of tools is not one of the more critical steps in obtaining the best future business processes. However, it can make a huge difference to the amount of work required and the usefulness of the results. The characteristics of these tools reflect their pedigree and they have been variously adapted to attempt a fit to the BPR market.

None of the tools covers all the possible aspects of BPR tool support. However, it is still a young 'market' and there are improvements being issued on a regular basis. More sophisticated software can be confidently expected in the coming years.

A number of the consultancies have developed their own tools to add to the 'magic dust' effect. If you are considering a consultancy with its own BPR tools, insist that your staff have the training and the ongoing right to use the product. Remember they are **your** processes and **you** should be using the results and further modifying them without having to call up the consultants.

Our advice would be to use a simple tool. However it is not easy, as the decision needs to be made very early in the project and the tools all have strengths and weaknesses.

What Else Happens in a BPR Project?

Turning over the organisation in the radical way demanded by BPR is almost certain to unearth many changes that will need to be made. These may well not relate directly to the business process work but any first-rate consultancy would expect to find enough 'other' improvements to fund the cost of the study. This is a very positive additional outcome. However, it does require a management team prepared to take on board other suggestions and put in place the implementation management at an early stage.

Do All Organisations Get Their Benefits Quickly?

Almost no organisation is able to achieve its future processes in the first 'round' of BPR. In fact, there is nearly always the need to move to a transitional position. This can be because of a strategic decision to hold back a jump on the competition for later and more timely use. However, more commonly, it is simply because the organisation is not able to move from the current to the future processes because of the constraints of the personnel concerned or the weaknesses of the supporting systems and technological infrastructure.

Whatever is the case, the future processes can usually only be phased in gradually and this may be over a period of years. However, all organisations start their implementations before the future processes are fully designed. Every company turns up some features of their current process that demand immediate action: whatever the future may require the current cannot remain as it is any longer. So the Chief Executive should expect to see some action (if only limited in scope) from early on in a BPR project.

How Useful is BPR?

In our opinion if it is done properly it is one of the most effective ways of making organisational change which has real impact on the customers. One of our clients was telling a major customer (a world-wide organisation) that the company was conducting a BPR project and mentioned some of the early thoughts on improvement. The customer's response was very enthusiastic and the client Managing Director had first-hand evidence of the positive market influence a BPR project can have. Remember - it is the **customer** who is ultimately the judge of competitive advantage.

It is sad that some BPR projects are reduced to industrial engineering jobs and kept well away from the customers. Although this may be the result of a first 'round' of BPR it will certainly have substantially less benefit to the organisation without the second 'round' of seeking competitive advantage.

The Consultants' View Of The Project

The IDP Processes

The IDP project began, as described above, with 'walking through' and documenting the business processes. One of the tenets of BPR is to grasp what is actually meant by the term 'process' and this in itself always causes concern. One definition is that a 'core process is a series of activities with a customer at each end'. For a manufacturing company therefore, we can think of **ORDER FULFILMENT** - that is, every step from taking the customer's order to shipping his product. Quite clearly, this can be too big a concept to get arms around in any meaningful way - identifying opportunities for improvement and managing change - though keeping it at the back of minds is invaluable.

Every improvement proposed in any activity should be tested on the whole: 'What effect will this have on the total process?' Many changes which appear attractive because they simplify or speed up one activity considerably can be seen to have little bearing on how the business actually operates. This then forces a follow-on question: 'Are we tinkering with individual process stages when our problem is that the whole way we do things is flawed?'

After some discussion we settled on the following as the major processes within the Newark operation:

- Order Winning and Specification

    - Proposal through order acceptance and product design / configuration

- Purchasing

    - The task of order placing plus all the supporting activities

- Manufacturing

    - All production engineering, production planning and direct activities

- Aftermarket

    - Everything connected with spares / repairs business not included in Purchasing or Manufacturing

Once the processes were documented, a series of workshops were held in which the staff from the various functions comprising each process examined the failings as things stood and, in a fairly loose 'brainstorming' approach, led by the consultants, developed a vision of the future. Attendees were the managers of each department together with other individuals selected for any of several reasons: they had particular expertise in one key aspect, they had worked in several areas and (in some cases) they were people who had never hidden their dissatisfaction with the way in which certain things were done. Such people channelled incorrectly can spell the end of such an exercise but properly focused they can be invaluable.

Identifying Opportunities / Changes

The workshops identified certain fundamental traits in these key processes:

Order Winning and Specification suffered from fragmentation of tasks and responsibilities, and from the fact that different products were handled in different ways. Orders were received and passed to a Contract Engineer who took responsibility for initiating the immediate actions required - such as special purchases and any investigative action with regard to the pump performance and design. The computer system entry was handled by clerical staff in this department, but different stages were handled by different people. Where new bills of material were required, the entry could be handled in Contracts or within the Commercial Engineering department, depending on the nature of the bills.

This fragmentation was further compounded by the nature of the company's products. Some are standard requiring no configuration, some require only minor engineering input and some are almost in the 'design to order' class. Within the families which are configured around a core design there are several generations of product. Those introduced in recent times were consciously designed around a coding methodology which makes order specification far simpler, and these are thus handled differently from the earlier models.

The workshops identified several key themes around which the improvements should be framed in this area. Two central pillars were to be:

- **parallel processing of tasks** rather than sequential. For example, orders must be entered to the system and automatically trigger the launch of casting orders. The established way of working was for the machining order to be created, and for this to call up the casting, involving a substantial delay.

- '**one stop shopping**' - i.e. when somebody picked up an order as many tasks as could be carried out in one pass were followed through. The idea here was to speed up the communication of information by cutting out in-trays or 'dwell' time.

Purchasing was an area where the company's lack of investment in business systems over the years made itself apparent. The information available on sourcing, pricing and orders in progress was limited in its scope and accessibility. Progress chasing, an essential feature in any business making to contract, where customer expediters are the bane of corporate life, was all-inclusive and extensively time-consuming.

In this area too the ideas of parallel processing and one-stop shopping were paramount. In addition, it was recognised that the business had to move to the concept of management by exception. Attempting to monitor everything happening on a contract reduced the time available for ensuring that every task was carried out as well as possible.

Manufacturing was already carried out very effectively. The business had moved to cellular manufacturing over recent years and had been very successful in simplifying and integrating the manufacturing process. As a DTI reference case on how to go about setting up and obtaining the benefits of cells, the company could be justly proud of its achievements.

What was identified, however, was that the supporting systems and procedures (that is, those away from the shop floor) had not kept pace with the progress made. In particular, the production scheduling system, by this time many years old, did not take account of the fact that jobs moved quickly through cells. It had been designed in the days of one week per operation, even though the cells now handled between five and eight operations to produce each component within one week.

It was recognised that what the business required in manufacturing was systems redesign and implementation around what we in BPICS would simply recognise as best practice.

The **Aftermarket** business was felt to have been neglected over the years - somewhat alarming given both the margins available and the nature of the product. Customers do not buy pumps essential to the operation of their chemical plant, power station, heating system and so on if they think that spares may not be readily available as and when required.

The process walk-through and workshop identified that the order tendering process was the major weakness - getting pump history was difficult and time-consuming (not surprising in a business still supporting product shipped in the last century!), and having issued a quotation it was another time-consuming task to retrieve it for conversion to an order. This became the key focus of the improvement programme in this area.

What was the Improvement Project?

As is described above, BPR is essentially about step changes in performance. It relates to process in order to avoid the sub-optimisation of, say, MRP where the internal workload of Production Control may be handled far more efficiently without the company seeing any startling improvement in service and hence competitive edge.

It has to be recognised that the achievements to date within IDP have largely been aimed at internal efficiency rather than at introducing whole new, radical, ways of working with customers to fundamentally change the way the business operates in its market. Hammer and Champy, in concert with those who have followed, talk of businesses transformed and unrecognisable from what went on previously. We cannot, and would not, claim this for IDP. What we would say is:

- The business, prior to this exercise, and without external input, had already made some fundamental progress. The CPX chemical process pump was designed and structured with the specific aim of being able to compete in Germany on lead times better than the domestic competition. As part of a world-wide initiative the company is introducing and progressively extending a PC-based pump selection and order handling system. Any salesman can use his laptop to feed in customer requirements in terms of liquid to be pumped, duty, conditions and market. The system then produces a specification for the customer (including performance curves, which is a big 'turn on' for any engineer), a quotation and the basis of the specification to be worked on when the order is later downloaded and sent to the appropriate business unit.

- As already noted, the introduction of cells means that components - which used to take six to eight weeks through machining followed by weeks of stockholding then assembly - are now machined in one week, and assembled into product in the next. The IDP Newark plant of late 1993 was already well down its path of transformation.

- What this project has achieved so far is to make a lot of internal improvements. By using BPR techniques it has been possible to ensure that every change made is on a consistent path towards a shared vision. (The absence of this is often the major obstacle to such programmes.) Because of the nature of the programme and the way it is understood throughout the organisation, it has transcended the limiting constraints of other exercises. It has been a reorganisation - several changes in structure and responsibilities; it has been a series of JIT-style attacks on waste; it has been a systems project which has delivered benefits which are seen and believed, and above all it has reinforced all the TQM concepts and methodologies already in place within the business.

What Did We Call the Improvement Programme?

We did not call it BPR!

Management was keen to ensure that the project was not viewed as a short term fad, which is always a danger in launching a new acronym - at least one new to the organisation. People had to understand what it was that the project teams were about: fundamental, ongoing change toward the common vision developed in the workshops attended by so many managers and staff. The term BPR was only used in senior management circles.

It was also important that the new project was not viewed as replacing Total Quality. Prior to the project the Newark operation had been pushing ahead with the Dresser TQM initiative which had delivered tangible benefits. Being seen to be changing tack might give the signal that the business did not feel that TQM had been right and were now trying out 'something else.'

There remained within the company, as within many others, some sceptics but there was also a core of genuine believers. What we set out to do was to gain the benefits of re-launching TQM coupled with a few different ways of doing things while retaining all that is good about TQM - principally working well in teams to give good service to the customers, whether they are users of IDP pumps or sit in the next office. The project was thus launched as **TQM94** with key goals defined as:

- Achieving, as quickly as possible, short-term process improvements in those areas identified as weaknesses.

- Beginning the transition, and establishing the framework for the company's future way of working. The enabling forces for the future way were believed to be:

  - the shared vision, developed in the workshops, documented and debated at length;

  - management commitment to this vision;

  - participation and commitment from all areas and levels of the organisation which would be established and maintained by clearly and visibly improving the way the company worked - *making people's lives easier* in many cases;

  - the necessary business systems structure to allow the information flow envisaged.

The final link in this chain, the company's new generation of business systems, was not going to be in place for some time. Our task was to ensure that we always kept sight of two objectives. The project - in this phase - was essentially about quick wins. Scarce resources had to be focused on improving the short term. At the same time we had to test each potential improvement against the future - did the fix fit? Were we confident that we were not introducing a way of working which ran counter to our longer-term vision?

Managing the Change Programme

TQM94 was established as a project with four parallel strands addressing the processes as outlined above. Each team was drawn from people involved in the core activity within the process (the most obvious example being buyers within the purchasing team) and those involved in the input and outputs - what in TQM we might consider to be suppliers and customers of the process.

It was decided that, in order not to stifle the creativity and initiative of any company personnel we would try to avoid having any team meetings either led by or dominated by senior management. It has always been a recognised aim of previous TQM activities and of management generally that the major leap in company performance would come through empowerment. The business, like every other, comprises a cross-section of people from those who simply wish to do a good job to those who want to be play a substantial part in making things better. We felt that this project, in particular, was a heaven-sent opportunity to bring some of these people on and channel their enthusiasm.

So much for the theory. In practice we are always faced with practical difficulties. One of these is that we have to work with the personalities available to us. In one case we picked a department manager simply because he was so obviously the right person to lead change in his area. In Manufacturing there were so many physical changes still taking place into which the process improvements had to mesh, that unless one person retained overall responsibility there was the potential for some disruption.   Of the four team leaders, we therefore ended up with two managers and two non-managers, one of whom had his own manager on his team.

The roles of the teams were clearly laid down. They were charged with exploring problems and solutions, identifying what had to be done, planning, initiating and facilitating. They were not charged with carrying out all (or any) of the tasks themselves. Some activities would involve many members of the team; all would involve people outside the team. Many of the actions arising from a team's decisions would be handed over to individuals wholly outside the team.

Co-ordinating the project was a Steering Committee comprising the General Manager of the business, his first line management team and the consultant. The Steering Committee had several roles:

- to monitor progress and set directions;

- to allocate additional resources as required;

- to determine priorities in cases of demand for constrained resources - notably MIS.

In practice this worked well - though only through constant vigilance and awareness of potential problems. Several times things were delayed because people took on too much rather than delegate tasks to others. Steering committee meetings too often became the forum where points of detail were debated - writing this as the consultant and supposed 'expert' guiding the company gives no pleasure since we were all equally guilty in this regard, and the meetings chaired by the consultant were as prone to being side-tracked as any other! Nevertheless, despite these occasional lapses, substantial progress was made.

The Consultants' View Of Achievements

Obviously, over a change programme lasting for most of 1994 the list of individual activities and changes made is fairly exhaustive and could make tedious reading. Rather than list them all, we have confined ourselves to the major achievements:

Order Winning and Specification	Improved contract handover mechanism - eliminated many copies of order sheets, etc. - to ensure that information required was communicated quickly and accurately and any special actions were initiated early in the life of a contract.
	Introduced new lead time communication method for world-wide sales force.
	Developed PC-based orders file, visible to all for workload planning, billing forecasts, etc. (Ongoing at time of writing.)
	Integrated order acceptance and EDM systems to improve speed of order entry to procurement and planning through use of configurable 'polycode' mechanism.
Purchasing	Developed and implemented automated requisitioning, eliminating several days in procurement cycle.
	Introduced order expediting and status tracking.
	Integrated purchasing and contract management reporting.
	Rationalised supplier base and initiated a series of service improvement exercises to reduce costs and improve delivery performance.
	Re-defined scope and nature of buying responsibilities, creating 'Materials Management' function within the business.
	Reorganised Stores / Goods Inwards to minimise movement and handling. Redefined stores personnel organisation and roles.
Aftermarket	Improved pump history records, enabling faster and more accurate preparation of tenders
	Developed and implemented tender tracking system
	Introduced automated label printing from order entry to reduce picking and packing times.
	Reviewed and simplified price lists and policies.
	Commenced sale of seal kits as complete sets from stock, card-mounted in blister packs.
Manufacturing	Improved / simplified process for sub-contract operation handling - covering order placing, despatch and receipt.

Developed and introduced new reporting facilities to move from attempting to manage all aspects of all contracts to management by exception.

Developed and introduced machining cell planning systems - identifying requirements from the cell rather than attempting to load individual machines (ongoing at the time of writing).

Developed 'rough cut' assembly cell planning for orders file. (Ongoing at time of writing)

Improved liaison with Engineering on drawing release plan.

Where Next?

The BPR project so far has covered two phases:

- The **review and re-design activities**, which were completed, apparently successfully. We believe consensus was reached on the weaknesses of the present and on the vision of the future.

- The **short and medium term improvement of priority areas**. Although not all the issues identified have been fully resolved (some because the enabling technology is not yet in place, some because the solutions just proved more difficult than had been hoped) enough 'wins' have been secured to improve business performance and provide a sound platform for future progress.

The third, and crucial part, is yet to come. What has been achieved so far is incremental, rather than step, change. This is not to demean the efforts and achievements of the many people who have contributed to the progress made but the real transformation sought by BPR can hopefully dwarf what has so far been done. In many areas, such as the extension of order handling out into the market-place (in fact, to the portable PC of the salesman sitting with the customer and producing technical specifications, data sheets and performance curves for the order about to be transmitted) the determining factor in timing is the availability of the technology. In others it is the availability of the internal resources to bring about the change.

The General Manager's View of Progress.

TQM94 objectives

As noted above, the project is by no means complete. Although we believe that the re-design process will bear fruit in the longer term we can only speak with certainty about what has been achieved so far. Most of our objectives were achieved through TQM94:

- a large number of process fixes and improvements by individuals as described above;

- the development of a clear business philosophy - JIT, polycoding, supply chain management, management by exception;

- the specification of a new business system. We are now in the process of system selection. We know what we want and we all know why we want each element.

In looking back over what has been achieved we would pinpoint several factors as contributing to the progress. MLG acted as catalysts for change, bringing to management's attention the disparities between how we **thought** the processes worked and how they **actually** worked. We recognised (and the consultants confirmed) that we had got the physical production of our products about where we wanted it to be. We also recognised that there was now a huge gap between the systems that we now needed to operate our market focused production facilities and the stand-alone batch processing that we had. In between, there were processes that had been created somewhat like Frankenstein's monster, from bits and pieces to enable production to function at all, and remnants of processes that served no purpose at all.

Having helped us prepare the vision and identify the short-term action programme, MLG then helped in the management of this programme. Ian Henderson, who in effect became a member of the management team, did much of the work of guiding the teams and keeping them focused. He was also a key member of the steering group to whom the teams reported on a regular basis. In my view it is doubtful whether this focus would have been so well maintained without an external and objective member of our management team continually goading us to make progress and stepping in with particular recommendations and guidance as the need arose.

Just as important, without commitment to improvement from the internal management team and staff, and without the skills, experience and enthusiasm inherent in our business, no external assistance could have been of any benefit. What this project has achieved is to start to bring the processes by which we execute our business up to the high standards already evident in the way we design, market and manufacture our products.

Company Objectives

At the higher level the main objectives from the project were to improve customer service provided by the Newark facility. We defined this, firstly, in terms of delivery reliability of pumps and spares and, secondly, in shortened lead times. These were seen, most importantly, as a key element in the order winning process but with the additional benefit of being important drivers in other areas. We also had strategic goals in the reduction of Work in Progress and Receivables and in increasing of productivity. It was recognised that only marginal improvements would be available from the process improvements in the short term; the important thing was to prepare the ground for the introduction of new systems and the step change we were seeking.

As it happened, rather more than marginal improvements were made, with delivery reliability moving from 77% to 81% during the year against a background of an increased order book and lead times reduced by over 30%. While there have, without doubt, been some areas where progress has not been as great as we had hoped, we consider this to be a major achievement following the upheavals of 1993.

References

1. 'Reengineering the Corporation'; M Hammer & J Champy; Nicholas Brealey Publishing; London; 1993
2. 'Software Tools for Re-engineering'; Business Intelligence report; 1994