



Manufacturing Exchange Group NEWSLETTER

MANUFACTURING EXCHANGE GROUP NEWSLETTER ISSUE 5

JULY 1990

Dowty's own Purchasing Conference

On May 1st, 70 delegates from the UK and North America assembled for a one day conference on Purchasing held at Arle Court.

In the opening address Tony Thatcher reminded the conference that Purchasing improvement had been a consistent theme of his since he first took office. It continued to be of major importance to the Group and ranked as one of his four key initiatives:

**Asset Management
Purchasing
Information Technology
and Market Intelligence**

The enormous importance of purchasing can be seen from the pie chart. Fifty percent of the Group's total expenditure is on bought out items. Tony Thatcher pointed out that a five percent reduction in purchasing costs would add £17 million to gross profit.

But he also warned that our customers were well aware of this. They were applying pressures on us both to increase labour efficiency and to reduce bought out costs substantially. Cost reduction must be a priority objective.



Purchasing Power! Purchasing Managers and Production Directors seen here assembling for the Dowty Group Purchasing Conference. Tony Thatcher was there to greet the delegates and introduce the conference.

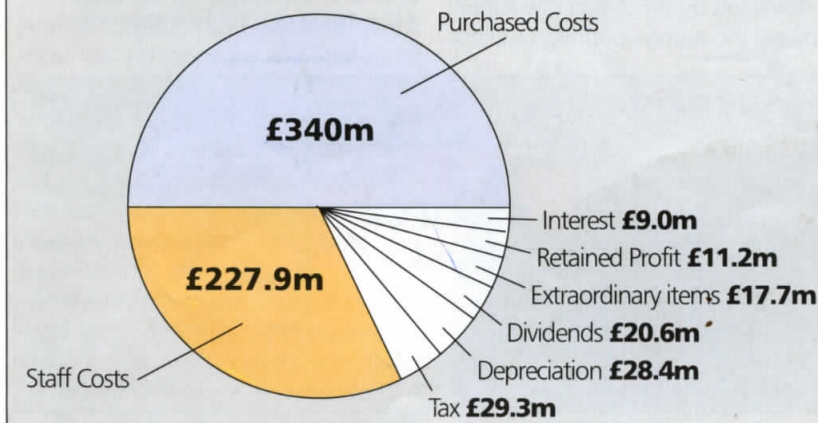
He emphasised that everyone in purchasing should know that they had the backing of the Executive Committee. It was up to them though to seize the opportunity and be much more pro-active. This included being

more assertive in their own company and making certain that the purchasing viewpoint was projected across the whole organisation.

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GROUP EXPENDITURE (1988/89)

Turnover £684m



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See centre pages for the Dowty Fuel Systems fastener pack story.

IT Procurement Task Force enters its Third Year



In a forceful presentation Frank Simons, President of Dowty Custom Electronics, summarised the achievements of the IT Procurement Task Force.

In its very first year the Task Force had generated cost savings of £750,000 across the division. In its second year cost savings were even higher at £1.8 m.

The five main ways in which these savings were made were as follows:

- Volume purchase agreements
- Supplier rationalisation
- The negotiation of kitted material supplies
- Utilising excess inventory and capacity
- Global co-operation to solve problems

A notable success had been the worldwide agreement negotiated with Texas Instruments. Task Force member Nick Japhtha described how this was

providing equality of service and pricing to any IT Division company.

Estimated savings as a result of this contract stood at \$500,000.

Frank Simons concluded by putting the way forward by developing a Preferred Partner relationship with

Collaborative Purchasing in Dissimilar Businesses



suppliers. He also called for more cross-divisional co-operation.

Mike Masters, Director of Manufacturing at Dowty Maritime

(Sonar and Communication Systems)

described how savings could be made even in a division with a wide range of businesses. Assisted by five of his Task Force colleagues he presented the methodology and progress made since the team's inception.

The total Electronic Systems Division spend (£44 million) was analysed into 20 commodities; 8 of which were common to at least 3 of the operating companies (equivalent to £19 million). In addition attention was given to services and indirect costs.

Considerable success has been achieved by appointing Project Task Force leaders to take responsibility for specific commodities as shown above.

This approach ensured that direct and indirect costs were tackled and demonstrated that there are savings to

Electronic components	Phil Evans	<i>Dowty Maritime (Sonar & Communication Systems)</i>
Office supplies	Stephen Slade	<i>Dowty Batteries</i>
Utilities <i>(Gas, Electricity, Oil)</i>	Peter Kewell	<i>Dowty Circuits</i>
Printed Circuit Boards	Bill Fagg	<i>Dowty Controls</i>
Test Equipment Hire	Andy Cutting	<i>Dowty Maritime (Ocean Systems)</i>
Computer maintenance	Jim Blenkinsop	<i>Dowty Fuel Systems</i>

A Professional Approach to Training



Peter Booth, the newly appointed Director of Purchasing at Dowty Aerospace Gloucester, gave a presentation entitled 'A New

comer's Perspective'.

Peter illustrated graphically that purchasing can evolve through three distinct stages. The basic level is where buyers perform a clerical order-placing role. Moving forward from this they work in an environment where the prime focus is on short-term issues, particularly delivery of shortages. This tends to create confrontational relationships with suppliers and with the buyers internal customers.

However, Peter Booth sees the Dowty Group providing the initiative and support to move towards strategic considerations and 'upstream' activities where the buyers will add value. The opportunities are there to develop a

broader approach and raise awareness of the many ways in which Purchasing impacts upon business goals.

Strategic Goals

There are several areas to explore and Peter Booth has started addressing such issues as Organisational Structure and People at D.A.G. He has developed a flatter and clearly focused departmental structure with staff looking to develop their skills working in flexible teams. Peter has separated the 'deal-making' from the supplier management (delivery) activity so that the buyers are not distracted by the day to day supply issues and the supply controllers will not

have to concern themselves with contractual issues. He has also placed a strong emphasis on training and proposed that Dowty considers linking with the IPS to establish an accredited IPS Diploma course. These initiatives are helping to strengthen internal co-operation within the Group.

There was a lot of interest in the implementation of measures of performance to enable objective appraisal of people and of suppliers, both internal and external. Policies and procedures should reflect strategic goals and we should be looking towards a Dowty Group purchasing policy.



The Strategic Position of Purchasing



David Smith, the Procurement Manager for the Polymer Engineering Division, gave a presentation in two parts. Initially he looked at the strategic position of purchasing where we should be looking to "buy the supplier, not the item."

Purchasing is the fastest way to the bottom line when looking for cost reduction but it needs to reposition itself in order to gain competitive advantage. This involves mapping itself against the business strategy and the market need.

This led into the second part of the presentation where the concept of a purchasing database was introduced as the key to collaborative purchasing.

Mike Lee, Market Analyst at Dowty Group Services, quickly and effectively demonstrated the capability that can be available within a relational database. The format has been quickly adapted

from the one in use in Market Intelligence.

Since the conference, Geoff Capps, the Group Financial Controller, has written to each Financial Director requesting the following information:

- a their top 100 suppliers**
- b details of address, telephone & fax**
- c amount/volume of purchase & currency**

They will also have to be assigned a commodity category code, a listing of the codes has been drawn up and David has written to the Purchasing Departments about supply of this information.

The data is to be collected in Planmaster by the 15th June, it will then be collated on to 'Open Access' which is the relational database used by Market Intelligence. The anticipated date for completion is the end of July.

Diane Wilding, a student apprentice, has been assigned to Group Finance for three months to co-ordinate the project in conjunction with David Smith.

Purchasing Database

At this stage any combination of the above factors can be analysed but

PURCHASING DATABASE

SUPPLIER

Aggregate spend
Spend by Dowty company/division
Product category
Geographical split
Income stream currency

PRODUCT

Aggregate spend
Spend by Dowty company/division
Geographical split

SPEND LEADERSHIP

Suppliers
Product categories
By buying market

having made this information readily available it will be necessary to agree a strategy on how best to use it in order to gain leverage for the Dowty Group.

Any queries should be addressed to Diane Wilding (Ext: 3821) or David Smith (Ext: 3200).

Purchasing on the Cheap!



In his customary forthright style Brian Farrington expressed his view that many companies were providing purchasing "on the cheap."

With responsibility for 50 percent of expenditure the purchasing department typically accounted for between 1 and 2 percent of the operating budget.

This limited the service that was possible. Within this budget allowance there was no scope for cost analysis or supplier evaluation.

He nevertheless recognised the much greater awareness of purchasing in the Dowty Group. He also commended the ability and enthusiasm of the people attending the Dowty purchasing courses.

He too advocated the need for a database to extend collaborative purchasing. He advised that expenditure on services should not be overlooked.

In order to stimulate further action

Brian called upon everyone present to submit within three weeks the action they would take as a result of attending the conference.

Training Saves Money!

The recent series of training courses run by Brian Farrington incorporate a cost reduction project. These were summarised in an earlier edition of the MEG Newsletter but readers may be interested in the following example

which demonstrates the benefits of working closely with design:

RECEIVER UNITS FOR SEA KING HELICOPTER

John Gargan is a Buyer for Dowty Maritime (Sonar & Comm. Systems). With the successful completion of a development contract the task was to reduce the B.O.M. cost by 15% for the production contract.



Sea King Helicopter

continued on page 4

With the material content accounting for 85% of the works cost it was apparent that efficient control of the materials element was essential to ensure the profitability of the project. A number of techniques which had been advocated by Brian Farrington were employed and these included Pareto analysis, learning curve, market testing and value analysis.

3 areas of savings were identified:

- 1. VOLUME RELATED: £112,800**
(lower prices through increased volumes).
- 2. MARKET TESTING: £28,262**
(alternate sources for the same product).
- 3. VALUE ANALYSIS: £95,664**
(co-operating with engineering to identify alternative technology that could be used at a lower cost whilst performing required function).

TOTAL SAVING £236,726

Many of these savings were only feasible due to sufficient time being available to identify and develop various opportunities. The cost reduction project will continue with the expectation of further savings and the aim of minimising contractual risk and stockholding costs. However, the project has already demonstrated the benefits of increasing co-operation with engineering and the returns that can be achieved from a trained purchasing function with sufficient lead-time and resources, to enable professional procurement.

STOP PRESS

Following the one day Purchasing Conference a summary presentation was made to the Group Executive Committee by Ray Jennings, David Smith, Peter Booth, Mike Masters and Brian Farrington.

A direct result of this is that a one day Purchasing Conference will be held for all Technical Directors to attend in order to develop the awareness and highlight the profile that Purchasing warrants.

Marketing: the Database Way at Dowty Electrics

Dowty Electrics have a customer base of over 400 customers, a product range of ten diverse generic product types which include both standard and customer specific variants. This diversity ranges from aircraft control handles to harnesses and from toggle switches to electronic cockpit dimming systems.

We service both the civil and military aerospace markets as well as fighting vehicle and industrial markets, at home and abroad. Such a diversity of product types encompassing a multitude of product variants servicing a number of markets, means that storage and retrieval of market information is a major problem. Our solution at Dowty Electrics was to develop a Marketing Database.

The system we have developed, based upon a standard software package, benefits from being menu driven thus allowing a complete computer novice easy access to all the information. It has been made available, through the company's established network of PC's, to any individual within the company who may benefit from access to the information.

period of time of our critical success factors and what strategic positioning to adopt against our competitors. Our planning will become more strategic as the information to produce marketing plans becomes more readily available. The system will become the focal point of competitor information avoiding the normal situation of information being dispersed throughout the company. Finally, the system has been developed in conjunction with the 'Group Marketing Intelligence Department' and so ensures compatibility with their system and any other systems developed in other Group companies.

The power of shared marketing information should not be underestimated and all our marketing efforts will be greatly enhanced when we have a network of marketing databases linked across all Dowty companies. This vision of commonly available information across all Dowty companies will enable us to act as a unified Dowty in response to customer needs, meeting the increasingly common requirement to a systems solution. It is our belief at Dowty Electrics that this approach to marketing is just the beginning of Information

The following information categories are held on the system:

- Companies:** Including customers, competitors and collaborators.
- Contacts:** Names of specific contacts within companies.
- Competition:** Strengths, weaknesses etc.
- Projects:** Projects of specific interest to Dowty Electrics such as Challenger II or E.F.A.
- Programmes:** Project build rates over a 9 year period.
- Sales:** Values of sales to a customer in a given year.

This information combines the knowledge of many experienced people within our company with statistical type information for use by all.

At Dowty Electrics we expect to benefit from the system in a number of ways, it will make us more objective in our marketing and selling activities by giving us the necessary information to target key projects, a better understanding will be given over a

Technology applied to marketing and having a foot on the first rung of the I.T. ladder will begin to give us the competitive advantage necessary for long term future prosperity.

Mark Doyle
Sales Executive
Dowty Electrics
0242 755131

Dowty Custom Electronics on the Road to Further Growth

As contract manufacturing becomes more and more competitive, it is essential that contract manufacturers start viewing themselves as an extension of the customer or, "The Preferred Partner."

At Dowty Custom Electronics we have taken this commitment to heart and we will continue to operate under this philosophy. It has become apparent that customers today are better educated and more aware of state-of-the-art manufacturing methods. To retain current customers and bring new customers on, we must strive to have methods of manufacturing second to none.

In preparation toward becoming a leader in contract manufacturing, Dowty Custom Electronics has undergone a complete plant renovation, with emphasis placed on flow manufacturing. The renovation was a major endeavour, starting with the breakdown of the production lines, including capital equipment, as well as years of tradition. The operations management team found themselves rebuilding a new production philosophy, both physically and philosophically, over a four day, four night period.

Many hours of planning, scrutinizing the production operation and



A cell concept. Again with work benches side by side in a "U" shape line, continuous flow is inevitable. The cell cultivates a focus on team work, feedback and sharing of ideas. These are currently used in the mechanical assembly areas where subassembly integration is performed.

envisioning the outcome preceded the actual move. Top priority was given to layout of efficient assembly lines that could support "flow" manufacturing. A layout task team was devised, made up of production operators, stockroom personnel, Q.C. inspectors, as well as management. Their mission was to devise an assembly layout with efficient, adaptable and flexible lines.

Progressive assembly lines were implemented, forcing the elimination of batch processing in the P.C.B. assembly area.

The same philosophy holds true in the mechanical assembly areas in which the use of cells was instituted.

A massive reduction of shelves and racks throughout the manufacturing operation proved to provide another vehicle for continuous flow. No longer can problem jobs be placed on racks for a period of time losing visibility. This level of exposure into the "problem" jobs forces workers and management to deal with issues as they arise.

Contract manufacturing has taken on a new look at Dowty Custom Electronics, Inc. It has been transformed from a traditional contract manufacturing facility to a manufacturing operation that exudes an aura of high tech sophistication. As contract manufacturing becomes more and more complex, we find ourselves building large intricate systems.

Diversification has become inevitable. Flexibility, adaptability and continual concentration on quality are essential elements in the success of contract manufacturing.



A progressive assembly line in the P.C.B. assembly area. Note: The work benches are along side one another. This produces a continuous flow of work-in-process (W.I.P.).

continued on page 8

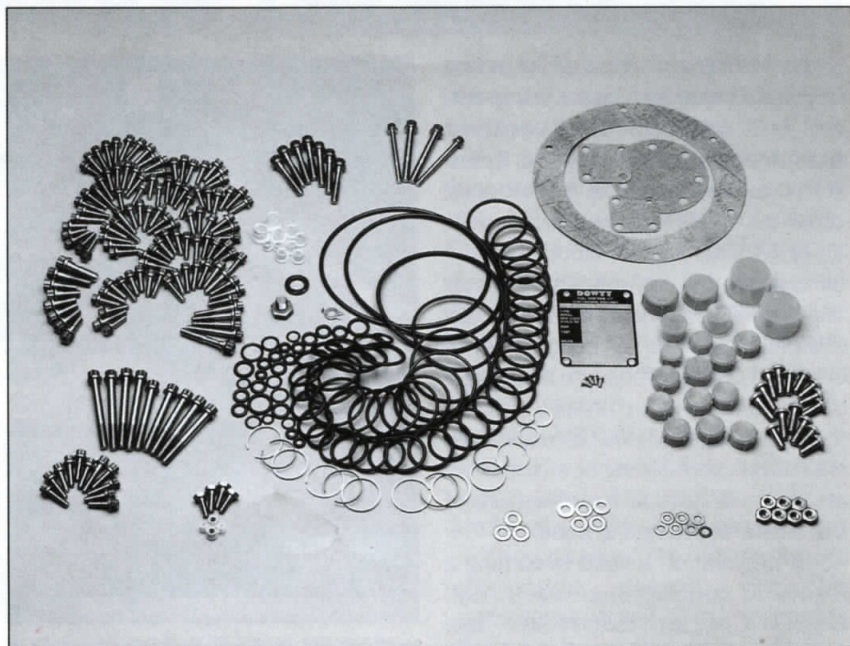
FASTENER PACKS at Dowty Fuel Systems confirms . . .

A system to improve the purchasing of low value items may seem low key perhaps, compared to some of the initiatives in your company, however the introduction of Fastener Packs is an example of how radical thought by a new member of the Company can have a significant effect when it is developed and implemented by team effort.

Analysis of our purchase orders show that Pareto is "alive and well". 80% of orders account for 20% of the value of all purchases. In the last 12 months four buyers have placed 10,000 orders, we clearly needed to find ways of creating the time to devote more effort to buying the high value components.

The idea was to purchase a kit of all the low cost items (see photograph above) from a supplier by using just one part number. Thus eliminating all the administration in buying, goods receiving, storage and kitting actions associated with handling individual part numbers.

The concept of buying low value items in a kit rather than individually is not new. Go to any DIY store and you



The pack of fasteners and other low value items, used to assemble one RB199 Reheat Control Unit

will see shelves covered with packs of components all aimed at a specific task. The introduction of this idea to our industry has been hampered by the usual 'put downs.' Our products are too complicated, what about spares, the computer cannot handle it, what about change control? All these questions

have been addressed at Fuel Systems but the potential benefits in reducing direct and indirect costs have been the motivation to succeed.

We now have Fastener Packs well established on two of our major projects, the Tornado reheat fuel control and the Harrier fuel control.

Making Fastener Packs work for DFS required a dedicated team committed to reducing the total cost of ownership of the components concerned. The team at DFS is driven by purchasing but includes representatives from Planning, Quality, Engineering, Build Standard Control, Stores and Inspection. It is also vitally important to include the potential suppliers at the earliest stage possible, in our case it was Lentem and Pattonair.

The initial cost justification was carried out by Purchasing, this showed that we could make savings of approximately 5% by reducing indirect costs such as purchasing, on receipt inspection, storage, kitting and stock holding. In fact the savings we see at the moment are close to 24%, made up of 5% reduction of the components themselves and 19% through indirect costs.



Single level assembly of the RB199 Reheat Control Unit using a fastener pack. Each item is individually bagged and labelled in the correct assembly sequence.

THE BEST IDEAS ARE SIMPLE

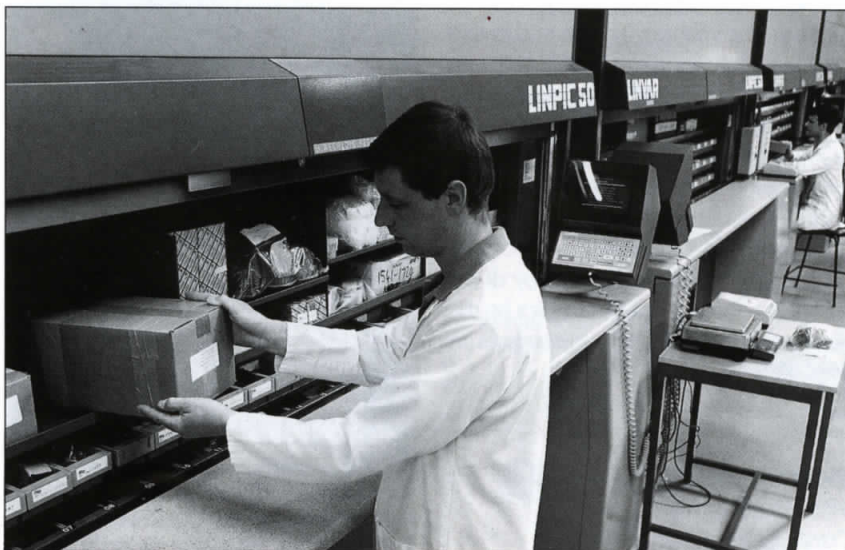
The major changes that needed to be introduced to ensure the smooth introduction of Fastener Packs:

1. All components of Fastener Packs linked under a single phantom part number in the MRP system.
2. Build standard control will synchronise changes in Fastener Pack content.
3. The packaging and documentation are such that the Fastener Packs can be delivered direct to the assembly line.
4. Existing DFS stocks have been sold to the Fastener Pack supplier.

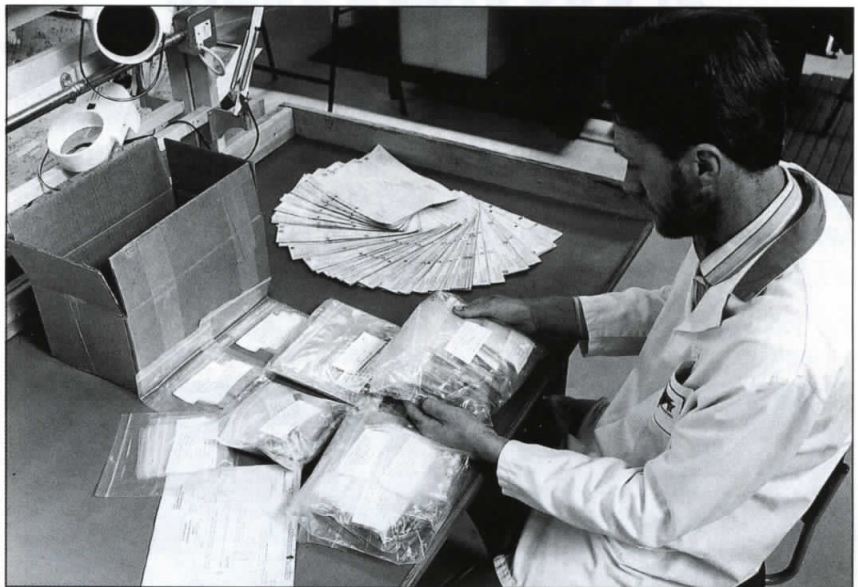
Many other problems were encountered but the team approach was able to resolve these problems quickly, so that the time from conception to implementation was six months, for the first Fastener Pack.

The benefits we are now enjoying are as follows:

- Cost of ownership reduced by 24%.
- Inventories reduced as kit deliveries are made monthly compared with individual low value part deliveries which are made six monthly.
- Buffer stocks held by the supplier with half day delivery if required.
- Lead times reduced as supplier holds stock and also forecasts requirements.
- Shortages reduced.
- Better supplier partnership.
- Number of parts reviewed by MRP reduced by up to 20%.



Picking made easy. Now there is only one part to pick from the vertical storage unit.



This picture shows a complete fastener pack as delivered. Also the pile of 150 purchase orders that used to be raised, compared to one single purchase order for a fastener pack.

- Rationalisation of fastener suppliers.
- Supplier base reduced as other similar parts are now sourced through the same supplier.
- Competition preserved - only two year exclusive deal agreed.
- Spare Fastener Packs are used to replace scrap incurred during assembly. These are then replenished by the supplier.

We are now looking to introduce Fastener Packs to our remaining products and we believe that repairs can also be supported with different levels of repair having varying Fastener Packs.

The whole project has been managed by our "coal face workers" who have once again demonstrated the ability to conceive and implement a radical concept, which is set to make savings in excess of £50,000 in a full year.

Jim Blenkinsop
Purchasing Manager
Fuel Systems
0242 533568

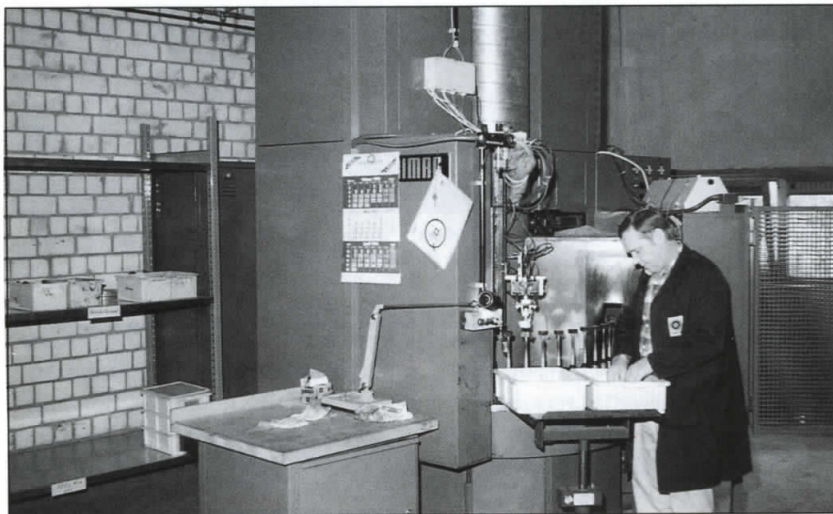
Special Purpose Machine - The Key in Precision Bonding at Klöckner-Dowty

Klöckner-Dowty is manufacturing rubber to metal bonded parts. The range of parts varies between very small items of a few millimetres and larger items of approximately 5 centimetres (see picture).

To manufacture high quality parts the bonding agent has to be applied accurately on defined areas, also the

quality of the bond strength is greatly affected by the film thickness of the bonding agent.

To cover these requirements and also to be competitive in the market place of precision bonded items, Klöckner-Dowty invested in 1986 in an automatic device for metal treatment and for the application of bonding agents. The machine is built by the



Sprimag machine for applying bonding agents to parts



Example showing range of component sizes processed

German company "Sprimag." Since this machine has been operating no cases of bonding failure have been reported by our customers.

The change-over to different part numbers is very easy, by using in-house made fixtures for the metal inserts. Developing the know-how to design these fixtures was a great asset.

Also changing from one bonding system to another is very simple. The machine is capable of applying one or two coats of bonding.

Herbert Baur
Technical Purchasing Manager
Klöckner-Dowty
2389 79760

Dowty Custom Electronics on the Road to Further Growth

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Over the next six months, a Total Quality Management (TQM) programme will be instituted into the business. Through thorough training and pull vs. push manufacturing methods, the elimination of in-process inspection is expected. Vehicles such as Statistical Process Control (S.P.C.) and team building concepts will provide focus in manufacturing as opportunities arise. Every production operator will be certified in a TQM concept entitled "3 Step Processing."

The three steps of "3 Step Processing":

1. *Inspect previous operation (Provide Feedback).*
2. *Perform an operation.*
3. *Inspect your own workmanship.*

Skills training as well as teamwork training is a vital key to the success of TQM. The feedback mechanism mentioned in 3 Step Processing is of utmost importance when instituting TQM programs. We feel it is of utmost importance to be able to provide this level of quality and service to our customers in becoming a leader in contract manufacturing. Only by doing so will Dowty Custom Electronics be the "Preferred Partner" of its customers in the 1990's.

Victor R. Giglio
VP Manufacturing
Dowty Custom Electronics
802 247 6811



An example of a complex system built at Dowty Custom Electronics. This Fluoroscopic Imaging System interfaces with x-ray generators for medical research.

CLEAR VALUE FOR MONEY AND FLEXIBILITY

The Key to Dowty Weapon Systems Strategy

When the recently formed Dowty Weapon Systems looked to the future, its 'lean and mean' approach created a familiar challenge; reduced staffing levels assumed MRP but the budgeted capital figures hardly seemed commensurate. Furthermore the rapid planned growth for the company required a system flexible enough to grow and develop with it.

The ideal solution was a modular network PC system. The major advantages are:

- Low initial capital investment (typically £500 - £1000 per Module)
- Flexibility to add Modules & PC's (or use existing Hardware)
- Each 'Terminal' has its own independant computing capability

The modular approach allowed DWS to purchase only those modules essential to its initial requirements, such as Bill of Materials, Purchasing and Inventory, and adding others as its needs became more sophisticated. Similarly, the use of IBM compatible PC's as terminals gives the company the ability to utilise existing capital equipment, add terminals gradually and provide users with an independant computing facility.

Whilst all network PC solutions allows for expansion, Weapon Systems were aware that this and its potential growth could lead to longer and longer response times and eventually even render the system obsolete. The chosen system, 'UNIMAN', offered several ways of upgrading the system without wasting hardware or software. Other pertinent advantages over similar systems were as follows:

- UNIMAN own the source code
- On-line MODEM support
- System can be run under UNIX
- Substantially lower costs per station

Upgrading The starting system utilised the central file server as a terminal; if the response times worsen then this machine could either act just

as a file server, be itself upgraded, or switch to UNIX operating system.

Source Code Given that all purchased systems require a certain amount of modification to screens, prints or reports, ownership of the source code was seen as a major bonus. Bespoke modifications have proved to be economically viable and enhancements have been undertaken as a result of User Group meetings.

Modem Support DWS have made use of the on-line Modem support to quickly develop management reports as well as solve user problems. A releasable version of the software is available which, when linked with a 4GL development language, (MEGA) would allow the generation of our own reports.

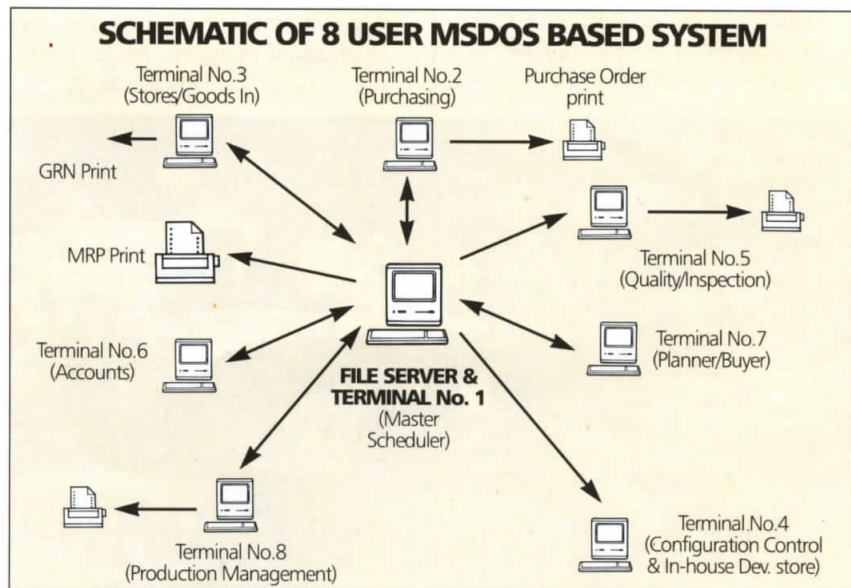
UNIX The company has always intended to move to UNIX which was designed as a standard multi-user, multi-tasking operating system and with the AT&T version 5 release 4 (V5R4) is poised to win market acceptance as the premier open UNIX standard. In addition to the operating advantages of UNIX, it would allow DWS to expand the system with dumb terminals, control response times and increase the number of stations possible.

Costs Originally designed to run on mini-computers (ICL system 25) the system shown in the illustration is

served by a fast 386 based processor. This runs 'Uniman' developed system 25 emulation software and splits the 150Mb hard disk into 30Mb sections. The present configuration under MSDOS is limited to 8 users, but a UNIX based system could increase this to 40 without discarding the file server. The cost of converting an 8 user system to UNIX would be approx. £4.5K. One of the advantages of a networked pc solution is that if the system outlives its usefulness then the hardware can always be utilised elsewhere. The typical eight user system illustrated, but run under UNIX, with 4 printers works out @ £4000 per user, this ration decreasing as the number of users increases.

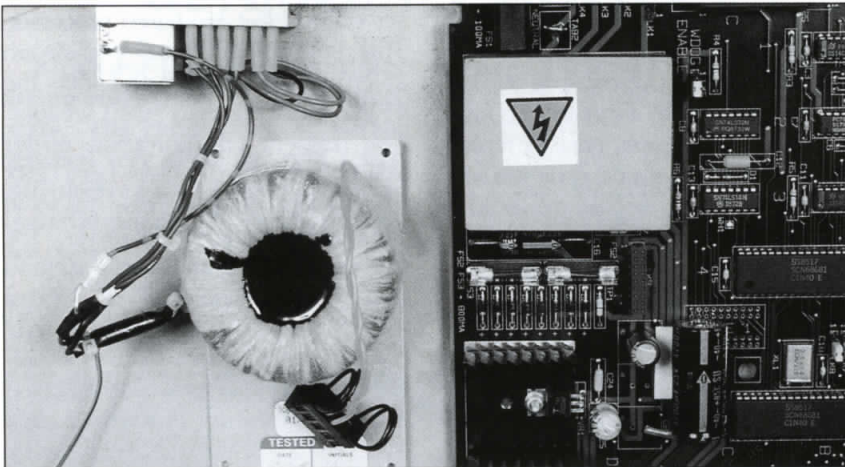
Future policy Since going live in September '89 Weapon Systems have introduced MRP I and plan to institute full MRP II by July '90. A Quality assurance module is due for release in Mid June, and incorporates features specified by DWS as well as the wishes of the user group. The package comes as part of a suite of application software and we are presently looking at the integrated accounts ledgers, and Contract Costing modules as part of instituting our IT plan.

Simon Evans
Systems and Programmes Controller



The figure shows how the original 3 user system is planned to expand into every area of the factory.

Competitive Advantage from DESIGN FOR TEST...



The new flat pack cost reduced method

The emphasis on cost saving is a big part of the manufacturing strategy for the 1990's. The cost saving plan can be divided into several different areas, test being one of them. The philosophy of designing product for test will then become important. What better way of getting the most out of your money, in test, than designing test into the product.

At CASE, printed circuit board tests consist of three major test stages.

1. In-Circuit Testing: Automatic Test Equipment (ATE) is used at this stage. The testing consists of isolating each component and checking its value, tolerance and functionality.
2. Cluster/Functional Testing: This test stage takes the product a step further and checks the functionality of a particular part of the board or the

whole of the PCB. This can be done with on-board diagnostics, special type test equipment or ATE.

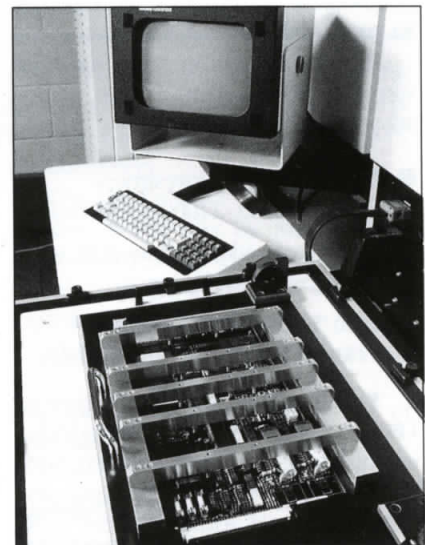
3. Unit/System Testing: This is the final test stage before the product is shipped to the customer. At this stage we are testing all PCB's which make up a Unit or System to customer configuration.

The CASE design for test philosophy has been implemented to reduce the time it takes to produce and debug ATE test programs. As a result the 'time to market' for new products has also been reduced.

The cost savings and time reduction were achieved by the following steps.

1. A good working relationship was established between Design Development and Test Development.

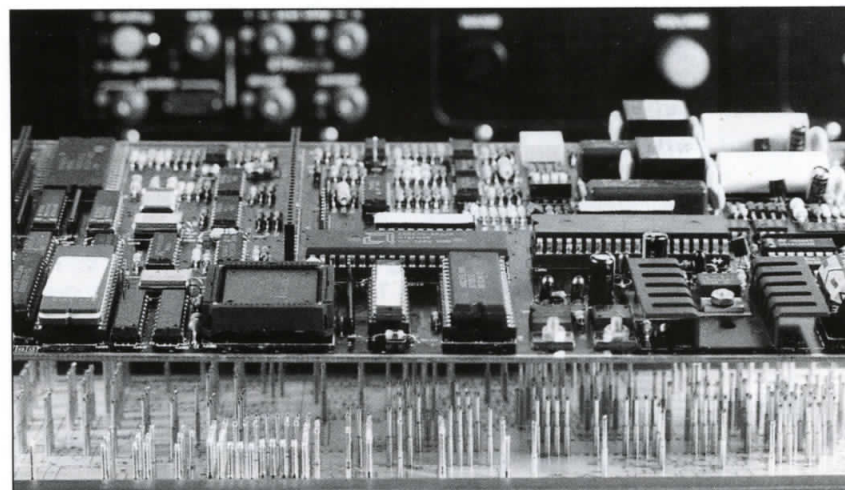
2. Testability guidelines were produced in order to standardise our design for test philosophy.
3. Critical component control lines were tied off via resistors to enable isolation of these components while under test.
4. Common components control and enable lines were divided to enhance isolation of these components.
5. Clocks were routed via links or gates which would produce a stable test environment.
6. Extra components were added to enable Board Under Test control.



Testing with automatic test equipment

Five years ago when this system did not exist, ATE Test generation and de-bug was a very daunting task. This was due to partially untestable printed circuit boards. The tests were unstable and we did not have control over the board under test. The test programs were taking up to nine weeks plus to complete, with 1985 technology. By introducing design for test we have reduced the figures for ATE test program development to seven weeks on some products, using 1990's technology. This results in a much more thorough and stable test environment, and around 20% savings in time and money. For the future we are looking to update our testers, which are now fifteen years old since their development, to reduce the ATE test development/debug times even further. This will lead to even greater savings of time and money in the test area.

Peter Maestas
Test Manager
CASE Communications Ltd.
0923 58181



The interfacing via bed of nails' fixture

... and DESIGN FOR MANUFACTURE

Two major events have influenced the design and documentation standards to which CASE designed products are presented for manufacture.

Firstly, to rationalize a large and diverse range of products (including many bought-in badged) a team of Industrial Designers were commissioned to define a corporate house style. The forthcoming standards stimulated many new product designs and have enabled frequent re-use of common parts such as plastic mouldings, panels, fasteners, and labels.

In practice, sensible interpretation of the design rules allows designers a great deal of freedom to evaluate cost effective packaging and meet tight delivery schedules. Adapting a flexible, yet structured approach also allows emerging standards and approval requirements to be introduced, whilst maintaining a unified product range by correct application of shapes, colours and graphics.

Secondly, procurement of an advanced CAD system for designing printed circuit boards provided further design rationalization. This, combined with investment in PCB auto-insertion machines, ATE and the increasing use of in-house computing systems, led to a number of changes and disciplines in project management and new product introduction.

Key to both issues was the generation and access to a database of components, both bought-in and CASE designed. These components, mandatorily vetted by QA, Production Engineering and Designers, ensure conformity to relevant approvals and manufacturing tools. Each PCB component, for example, is defined by specification and relevant electrical and mechanical parameters are reproduced as library entries within the PCB CAD system. The output tools of the CAD system thereafter accurately ensure hole size, orientation and insertability.

Additionally, during the design cycle a number of checks and measures take

place. Some prompted formally during a series of design reviews, others through less formal design-circle meetings. These disciplines enable the project team to verify compliance with the product design specification and assess manufacturability and maintainability.

At an appropriate time in the development cycle, pre-release documentation is forwarded to the production engineering team who build a pilot batch of printed circuit boards and mechanical assemblies. A formal production engineering report is then fed back to the designer, highlighting perceived manufacturing problem areas. Any suggested remedial action is then evaluated and implemented prior to final design release.

The more recent addition of a mechanical Computer Aided Design system has been justified by enabling the swift reproduction of similarly packaged products, particularly those for OEM customers and international variants. The ability to evaluate alternative assembly and styling proposals without lengthy design iterations has paid dividends in getting products to market quickly and accurately.

Encouraging a close working relationship between CASE designers, the production liaison team and outside suppliers, focuses on value engineering prior to product release. We recognise that retrospective cost reduction can affect expensive tooling and disrupt planning and approvals.

It is worth remembering that much of the cost of a product is committed to at the design stage and it may take months to see the results of a bad design. Our aim therefore is to ensure that design for manufacture is inherent during the whole design cycle and that ANY relevant input is heeded prior to release for volume production.

Phil Green

Design Services Manager
CASE Communications
0923 58746

Training for Supervisors
**DOWTY
AEROSPACE
GLOUCESTER**

The need to develop its supervisors is seen as an essential element in Dowty's drive to improve efficiency and productivity. Although much investment has been made in new facilities, machine tools and information technology, people remain our most valuable asset. To ensure that everyone is aware of, and equipped to fulfil their future role in the business, appropriate training is essential.

To meet the business challenges of the future, supervisors need to develop both their technical and managerial skills. They must be able to analyse and use information to solve a wide variety of problems and understand the competitive environment in which Dowty operates. They must adapt readily to technological change, the pace of which is likely to increase in the future. This pace of change will open up exciting opportunities for supervisors willing to accept, and indeed seek, greater levels of training and knowledge.

In the past, the role of many supervisors has revolved around solving avoidable problems, routine administration, relaying instructions downwards and information upwards and playing organisational politics. In future this essentially passive role must change to a pro-active one. Supervisors will be able to plan and set targets and monitor agreed objectives, taking corrective action when necessary. The emphasis will be on problem prevention both from a technical point of view and in terms of the support and motivation of the workforce.

The Supervisors' Training Programme started in 1988 with a one week, off site residential course for supervisors from the manufacturing area. The course focused on leadership, the management of people, the implications and application of Material Requirement Planning (MRP) and manufacturing finance.

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Training for Supervisors
**DOWTY AEROSPACE
GLOUCESTER** *cont'd*

Following on from this a series of one-day, single subject add-on modules has been completed covering finance, quality in manufacture, problem solving and communication. Each element of the training will be updated and repeated as necessary in the future.

Top management commitment is essential for the success of any major initiative so the training courses introduced at D.A.G. included participation from Directors and Senior Managers as well as Group Training and other key personnel. Training is structured so that it is readily related to "real-life" at D.A.G., both as it is now, and as it will be in the future. Emphasizing that training is not linked to performance assessment encouraged active participation free from inhibitions which enhanced the value of the exercise.

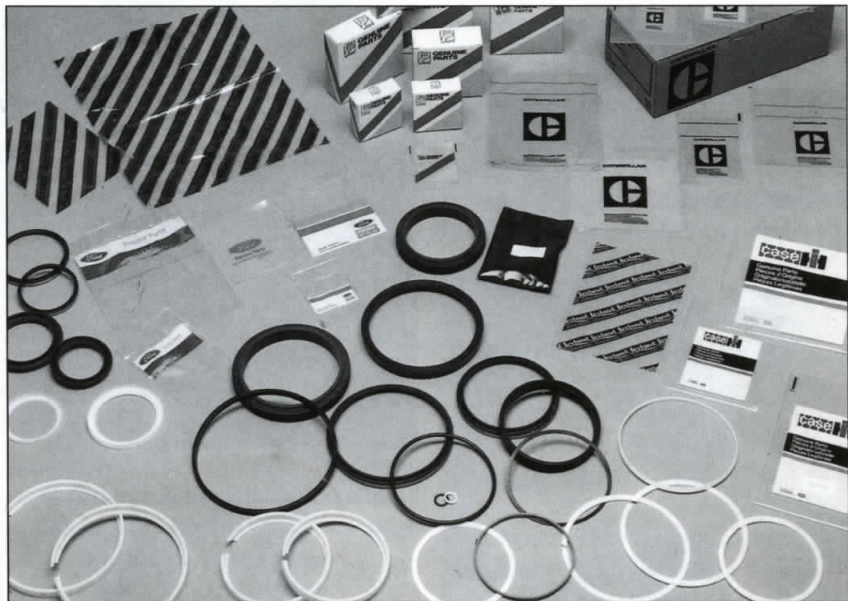
To derive the maximum benefit from the training, each supervisor required the full support of his manager. In many cases this involved a pre-course discussion between manager and supervisor to establish individual aims and objectives. Each manager conducted a debrief with his supervisors after the course.

To supplement the off-site courses, additional in-house training is available for supervisors with specific requirements. In addition they are encouraged to use local technical college courses to improve their education.

Although recent supervisory training at D.A.G. can be considered a success story it is also being recognised that it must be extended to cover all supervisors from every department, not just manufacturing. This will open the benefits of training to all areas and help to engender a team spirit throughout the factory. When Supervisors can understand their own problems and those of others, in the context of D.A.G.'s competitive position in a world marketplace, the result has to be an improved Company performance in all respects.

David Waring
Director Manufacturing
Dowty Aerospace Gloucester
0452 711467

Dowty Seals "Kits" for the Customer



Dowty Seals at Ashchurch, near Tewkesbury, have for some years been actively selling to their customers the benefits of purchasing seals in 'kits.' Dowty Seals will package as required for direct presentation to customers' assembly lines and already supply British Coal, Massey Ferguson, Ford and J.I. Case.

Dowty Seals also offer the service of packing seal 'kits' in the customers' own packaging to companies such as JCB, Caterpillar, and the Multipart spares operation.

Ken Allen
Manufacturing Director
Dowty Seals
0684 299111

Dowty Fluoro Precision Coatings have, for the past 6 years, produced high quality refurbished Fuser Rollers for use in Office Photo-Copy Machines.

The expertise built up over this period has now been instrumental in obtaining a large contract from IBM Svenska AB (Sweden) for the supply and coating of Hot Rollers in their Laser Copier.

As prime vendors in this project, Dowty Fluoro Precision Coatings are responsible for obtaining the mach-

ined Roller which is then coated with Du Pont's Silverstone Supra. This is a 3 coat application of a special Fluoro-plastic which combines the best of Non-Stick, Abrasion Resistance, and Heat Resistant qualities.

Coating tolerances are very tight and have to be maintained over the whole of the specially profiled surface. This accuracy is checked by computer controlled laser equipment.

Bill Booth
Sales Director
Dowty Fluoro Precision Coatings
0483 276887



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