staff found it very easy to compile programs. Poole and the programmers would sit down with the estimators and actually write a program with them, test it with them, and make any necessary corrections until the program was to their satisfaction. The analyst found that by using the R850 for the project a great deal could be saved on development time and consequently costs. Comparing estimated development time using COBOL programs and Editor running the same application and functions it was found that in many cases it took about a quarter of the time on the R850, this being a significant saving when one weighs that up in terms of costs.

## FOUR PHASES

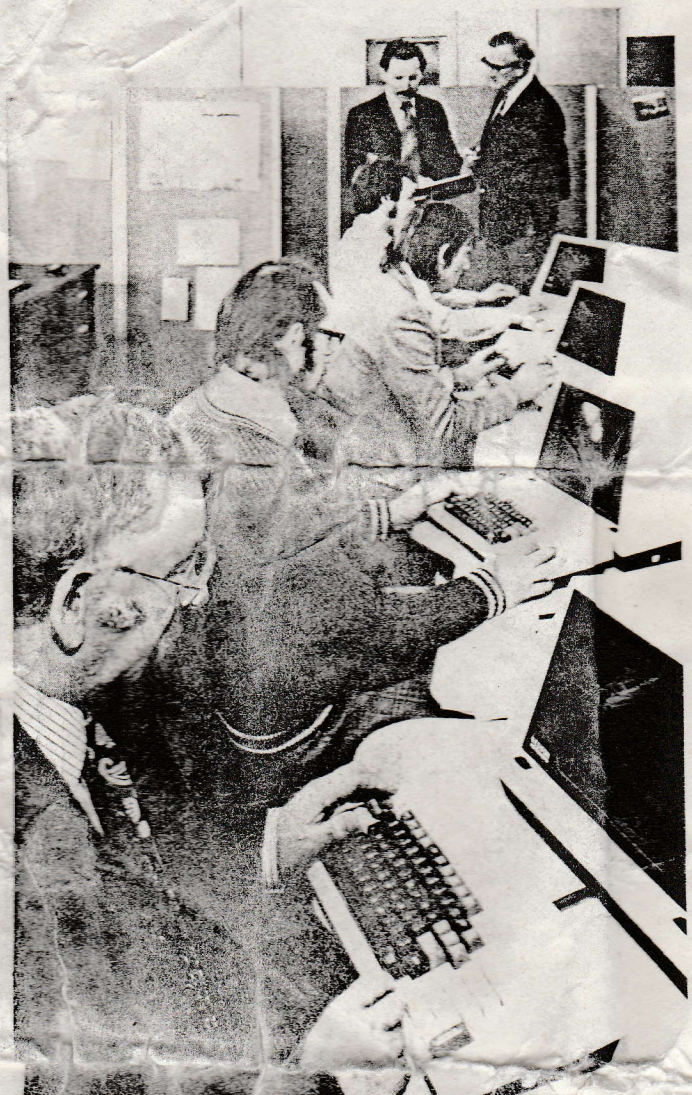
The project was divided into four phases because it was huge in terms of scope, and there were so many differing factors and needs to be taken into consideration such as, for example, a mass update facility.

The first phase set up the components database with calculations to produce the price of a nut, bolt, piece of metal or whatever. Estimators have to decide the size and type of the material used, how much time it takes to turn a component across various operations and how long it takes to assemble the component, i.e. the finished job. However, this can cover a small sub-assembly costing five pence, to a chock which is in the region of £20,000. The weight of material, the price of material, machining it into a component, adding all the components together, putting it together in an assembly and testing it results eventually in a chock being made. When the raw material prices go up or the factors alter such as the rate per minute for an operation, then the estimators use the excellent Rediffusion command macro system and procedures and link together various output programs which go through the whole database and simply update each record. When this has been completed, the estimator can then immediately new details having been applied.

There are now some 4000 components on the system and although there has been a definite improvement, in the workflow of the department, the real benefits will start to come when they have achieved their goal of 6000 components.

Phase two involved the stringing together of components to make assembly and sub-assembly files. Once the assembling of components started, another set of times, factors and values were applied. Dowty Mining set-up another database for these assemblies which is large and now takes up quite a slice of their 66MB disk. The database files have headers, trailers and part lines, the latter being the components which were set up in Phase 1.

Having done that they looked at the metal which is cut out and forms part of the valve packs, base and legs for example, which are welded to make various fabrications. This phase solely covered the chopping up or flame cutting of sheet metal, welding it, shot blasting, machining, painting it, and lots of other processes to achieve the final product.



Phase four was very similar to phase two in that it covered assembly, but this took the completed sub-assemblies and the fabrications which together make up the total chock. Having created a data retrieval system, Dowty Mining wished to reap benefits from some form of mass updating on completed assemblies and fabrications. Now estimators can pick up a particular assembly which has been made, alter any details therein, and run a program against it which gives them a new picture thus saving the valuable time of estimators having to write out the whole assembly again and recalculating all the answers.

## ENQUIRY SYSTEM

The estimating department probably run one of the most complex enquiry systems that is run on any Rediffusion system and it has to be very fast and efficient. For example, an estimator can now get at a component by its part number, description, factor code, and at least a dozen other different ways. The estimators are grateful that Rediffusion have this in-built enquiry system because if they resume any file in the database they can actually search on a character sequence. Poole maintains that by using this simple system one can actually step around having an enquiry program specially written and use the Rediffusion enquiry facility to seek out required records.

## SPARES

The R850 also handles the manufacturing spares. When a chock requires repair or alteration then the estimators have to calculate the latest prices and details for the replacement part, no matter what it is. Therefore the R850 also handles within its capacity, a spares function.

## NEW PROJECT

A new project is currently being developed — bill of materials processing type application which is no mean feat on a mini-computer. However, a limitation to the R850's software architecture has been found. The department is making the system stand on its head and toes simultaneously. They have tried to follow the logic paths which are permissible on the equipment, but unfortunately the software cannot cope at this stage with the very difficult and intricate programs required. To understand the problem one must consider the work involved, the size of the programs, and the linkages where the R850 is calling up no less than 15 x 250 page output programs within 12 macros, which themselves are part of a command procedure, then one realises that the task is of marathon proportions. By putting their heads together and working in close co-operation, the Rediffusion and Dowty analysts have now found a solution. It means adding fifteen minutes to the overall run time of about 90 minutes per chock and perhaps inserting another module thus avoiding the area where the Editor language does not wish to tread. "There are always two ways of skinning a cat. Analysts and programmers should never be reluctant to seek out all the possible options no matter how daunting the task," said Poole. The command procedure will update every required component, assemble those components, and produce the finished chock containing around 1000 components. A print out will accompany this which is an indented print showing all the [illegible]. With the [illegible] will save the estimators considerable time. It will allow them to do more of the productive elements of estimating — the more 'thinking' aspects of estimating. The rewards of having such a system is already bearing fruit. With the data being assembled on the R850 and the use of mass update programs, the old details on each record will soon be updated whereas with the old manual method it would take months to complete. It cannot be