

PACEMAKERS

The building

High output, low running costs . . . and clever use of new techniques

A good design pushes up productivity, puts workers in the right mood and keeps them safe. It may even save a fortune in maintenance

NEAT, bright, functional and clean. That just about sums up this year's pacemaking plants. New factories may perhaps be expected to look clean and neat. But a common feature of the pacemakers is that they have been designed to stay that way for a good many years.

In most older factories, maintenance of the building—window cleaning, painting and the like—is a big expense. But with up-to-date materials and design, factory building can be made virtually maintenance free. The architect of one of our pacemakers, John Crowther, reckons that the only

maintenance that will have to be done on the OMT factory in the next 20 years will be repainting the flag pole.

Windowless factories are certainly now the order of the day. The plants selected last year suggested a trend towards that kind of structure. Among practically all this year's plants windows can be found if you look hard enough, but they have taken on such an insignificant role that their presence seems to have been included purely for nostalgic reasons.

The main reason for the lack of windows is the extensive use of air conditioning. As Dr. Noble of RCA

points out, windows and air conditioning just do not mix. If there were windows in an air conditioned plant they would have to be sealed. Even in those plants where most of the area is not air conditioned, windows are hard to find. At Eaton Yale & Towne, for example, they are limited to a narrow strip under the roof all round the production area, mainly to eliminate maintenance. In all the plants windows have been retained for offices, canteens and other non-production areas.

To keep down maintenance, and thus costs, steel frame construction with walls of clad metal are the order of the day for most pacemakers: ease and speed of erection are valuable advantages, particularly for new developments built in stages. The main production area of OMT's factory, for example, was built in two stages. Construction of the second half involved one wall of the first building, which was simply moved from its original position to form a new outside wall.

The cladding chosen for OMT,

Galbestos, was used in some other pacemakers. It is basically steel sheet with four coatings to provide corrosion protection and reduce maintenance. The coating allows the steel to be cut, drilled or punched on site, without risk of deterioration and without the need for special attention to the cut edge. Other walling materials used by the pacemakers included precast concrete slabs, coated aluminium, and some brick (mainly for office blocks). Horstmann Gear used reconstituted Bath Portland stone to good effect, but selection of that less usual material was governed by local buildings regulations in the City of Bath.

Flooring has been given a lot of attention. In several plants the good old-fashioned concrete floor is no longer enough. OMT, for example, has an epoxy coated floor in production areas and Elbeo has one covered with Magnesite, to ease maintenance, prevent damage, and stop oil becoming impregnated in the concrete. The production areas at Horstmann Gear are fitted with an uncommon type of floor for machine shops—wooden parquet: its products (mainly screw gauges) would have to be scrapped if damaged by being dropped accidentally on to a concrete floor. To cater for its laminar air flow system, RCA has, in its white room production area, the sort of flooring normally only found in computer rooms. Rockware uses granite-chip cement surface on concrete, which is both cheap and hardwearing. Cadbury Schweppes has vinyl flooring throughout production areas for ease of cleaning.

The main emphasis in offices is on durability. Thermoplastic tiling is used in most. Some conventional carpeting can be found, although OMT uses hard wearing grades of felting and Elbeo's offices are fitted out with Huega carpet tiles. Rose Forgrove uses polypropylene pile carpeting throughout.

Design philosophies of the pacemaking plants were governed largely by production needs. Plants can be built at reasonable cost with modern construction materials. It is clearly worthwhile, in terms of higher productivity, to invest in a specially designed plant. Elbeo, for example,



new factory, rather than any radical changes of production method.

Two main factors affected Elbeo's design. Size was governed by the length of the knitting machine lines, and extensive air conditioning had to be incorporated. Like most of the pacemakers, the entire production area is on one floor. Offices along one side of the building are on two floors—the air conditioning plant is incorporated on the first floor, but separated from the offices by lavatories and other rooms to prevent any disturbance to office workers by noise from the plant. And it has a basement (rare among the pacemakers) which forms part of the air-conditioning system and houses plant for the vacuum and other services for the machine hall. Elbeo, incidentally, is one of the few pacemakers to have had any construction headaches. The site is only 20 ft. above sea level, the ground consists of clay and silt, and a high water table means it is often waterlogged. As a result the floor had to be 6 ft. above ground level to prevent flooding. For stability, 118 piles were driven to an average depth of 35 ft. Horstmann was another plant with flood risk. The solution there was to install automatic pumps which operate if the nearby river overflows its banks.

The Elbeo plant is an example of international cooperation between British architects, constructors and consulting engineers, and other specialists in Germany. RCA also enlisted overseas help: American architectural and engineering consultants. Apart from the exacting demands of the production processes at RCA, the general design reflects something less tangible. Design started as a purely functional plan to define areas and principles: only after that had been done did the architect go to work. He had several problems to overcome, apart from the sophistication of the design. It was not enough to provide a superclean plant; the whole building had to encourage cleanliness among the workers. All through the emphasis is on clean, clear surfaces. Even in the chemical mixing area an attempt has been made to upgrade what would normally be a messy process. Plant manager Noble aims to keep the area "like a ship's engine room."

Psychology came into the design of OMT's factory. The work to be done there demanded an atmosphere encouraging concentration and a general regard for quality. That has been achieved by great attention to detail, right down to the choice of door handles. The Royal Mint, too, was designed with more in mind than merely providing a roof over production equipment: it had to be "monumental". Other plants such as Cadbury Schweppes

Rose Forgrove had to accommodate optimum work flow and promote efficient handling.

The pacemakers' office design was generally conventional—in many cases somewhat dull. A notable exception was OMT, where as much thought had been put into office design as in production areas. Glare and heat-reducing windows, colour and Danish furniture combine to make a pleasing environment. Use of the highly flexible Tenon Contracts partitioning system adds to the look of things, and the associated interchangeable wall units mean offices are efficient and uncluttered. The system is neat—even light switches and power points are cleverly incorporated in channels between the partitioning units. Filing cabinets and so on are hung from the same channels.

Rose Forgrove has an interesting set of open plan offices. The design office area, walkway and clerical staff in a general office are subdivided by 6 ft. high panelling of clip-together framing bearing translucent, tinted, sculptured and moulded panels. The company says benefits include low initial cost and ease of rearrangement. Ectona Fibres has offices which, while providing a high degree of comfort, promote an air of calm efficiency. And the Mint's offices are impressive, considering that they are only temporary. In fact they are better than many permanent offices in other organisations and it should be interesting to see the Mint's permanent staff accommodation when everything has been transferred from Tower Hill.

But if office design is, with one or two exceptions, uninspiring, the general working conditions and amenities are high. Indeed, about as much thought seems to have been given to the creature comforts of workers as to production, a healthy sign at a time when employers are continually being told of the need to provide good conditions as an antidote to high absenteeism and low productivity. So much attention was given to environmental control in the design of pacemakers that it is the subject of a separate article (page xxxviii). General worker amenities are also high. Lavatory and washing facilities were often better than those in local hotels. OMT, for example, provides showers, floor to ceiling ceramic tiling, and stainless steel wash basins. Eaton Yale & Towne has wash basins on the production shop floor—mainly for the benefit of production workers, but also to deter early 'knocking off' to get to the toilets at the end of each shift.

Canteens are well fitted out, and generally cater for all workers up to the managing director. All kitchens are lavishly equipped and

RDL Serve Britain's pacemakers

Of Britain's ten pacemaking plants, the steelwork for three was supplied, delivered and erected by Redpath Dorman Long.

The plants were:

CADBURY SCHWEPPE'S

Chirk, Denbighshire

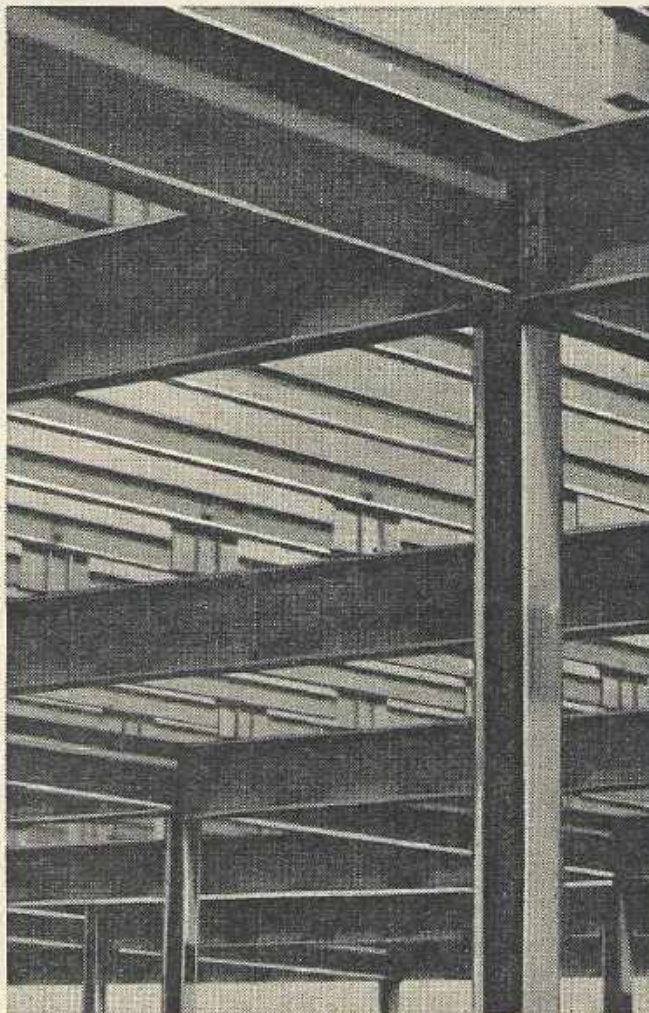
ROSE FOREGROVE

(Baker Perkins Group) Seacroft, Leeds

ROYAL MINT

Llantrisant, Wales

Redpath Dorman Long fabricate and erect structural steelwork for all types of building throughout the world.



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efficiency with quick lunches, pre-cooked and then served from microwave ovens. Even the after-lunch coffee comes from a vending machine.

The tea trolley has virtually disappeared from this year's pace-makers, and in many cases the teabreak too. All provide vending machines for drinks, and most for cigarettes. Quite a few machines have also been put in for snacks and confectionery and no plant manager seems to doubt their value as a productivity aid.

A lot of thought has been given to safety in all plants, and most have extensively equipped medical rooms with a nurse in full-time attendance and a doctor calling once or twice a week. In areas where acid is used—at RCA and Ectona, for example—there are

'eye showers' in case of emergency.

Security is something that they all take seriously. Modern construction methods provide, as a side-effect, better security. For example a steel clad frame with, say, two or three entrances and no windows is quite a problem for a would-be burglar. Add a night watchman and ask the police to look in at weekends, as Elbeo does, and the plant may be reasonably safe. Let workers buy 'seconds' at low prices and pilfering from within is no problem. Others add the services of one of the security organisations to protect their plant. RCA takes its security a step farther with an elaborate Minerva automatic fire and burglar alarm system.

For the ultimate in protection the Royal Mint takes some beating. Not surprisingly, Mint personnel do

not talk about the security precautions. But even from a casual glance at the outside any would-be crook (or possibly militant nationalist) will be put off.

First there is a double wire fence which would be difficult to negotiate. Between is a ploughed area with something apparently buried in the ground. The Iron Curtain effect of the perimeter fence is completed by strong floodlights every few yards. All that is missing are machine gunners in towers. But a pack of Alsations and a force of security men on patrol are augmented by electronic gadgetry at such vulnerable points as windows, and television cameras inside the plant.

Numerous notices leave no doubt of the dangers of letting even one new penny find its way outside

via a trouser turn-up. All employees are security vetted before being taken on, and are liable to search when finishing a shift. Just in case coins find their way out illegally, the weight of all metal coming into the plant is checked against the amount going out, so significant losses can be detected.

Fire precautions are also extensive in the plants. Sprinkler systems, both smoke and heat activated, are to be found practically everywhere.

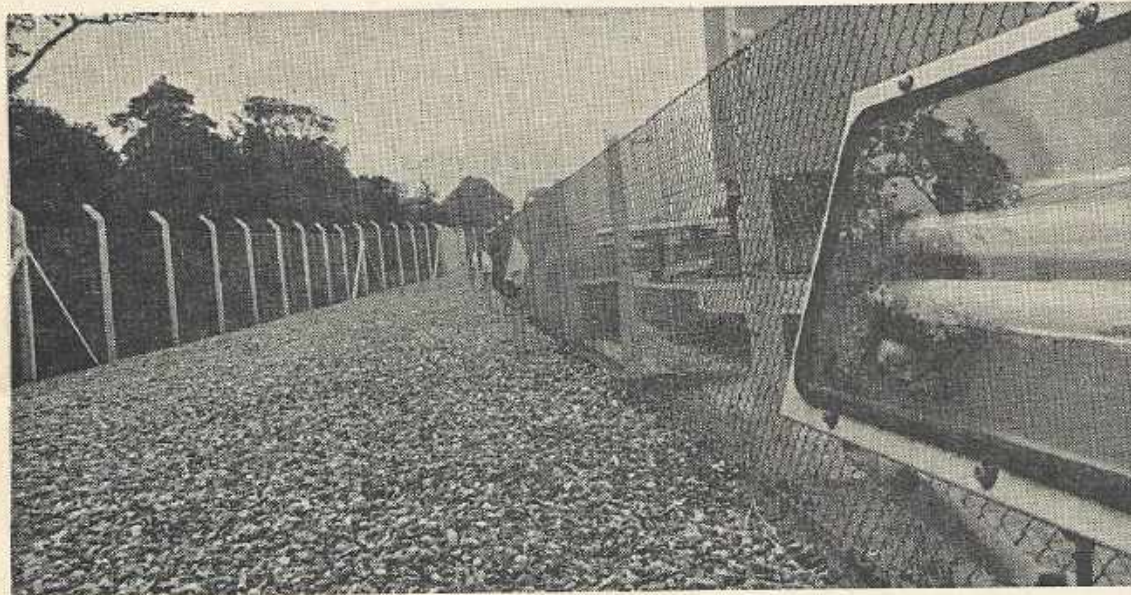
One exception is Horstmann Gear, which relies on a works fire brigade and a river which conveniently runs along one side of the site. Some, such as RCA and OMT, also have automatic alarm systems to put through an automatic call to emergency services. Staff members are also called at home. RCA's white room is fitted with burst-through fire doors in case of emergency.

The most elaborate fire precautions are at Ectona Fibres. A couple of the processes there are potentially highly dangerous, carrying the risk of explosion. Indeed, the emphasis given to fire and safety precautions is apparent from examination of the plant. The buildings are surrounded by dozens of bright red fire hydrants.

So the Ectona plant was designed with safety in mind. Dangerous processes are carried out in inert gas, and all equipment is earthed. Ventilation and humidity (above 50 per cent) are controlled automatically, purely for safety. Since manning levels at the plant are low and some areas go for long periods without being seen by an operator, automatic safety check points are incorporated. Any spillage is detected and fans and dampers start automatically to bring in a supply of fresh air and give warning signals. The plant is fitted with a deluge sprinkler system which has been hydrostatically designed to give an equal coverage fog spray.

The two hazardous operations are kept apart carefully and the section in between houses production offices and a maintenance area protected by fire walls. Other features put in with safety in mind include hefty fire doors, use of asbestos, and outside walls in one area which would blow out in sections in the event of an explosion.

All employees in production areas are supplied with special clothing, including cotton underwear and non-conducting shoes. The idea is to eliminate static electricity. Special areas have been set aside for smoking, and are fitted with wall-mounted cigarette lighters to prevent matches being taken into the plant.



Floodlit perimeter fence at the Royal Mint.

