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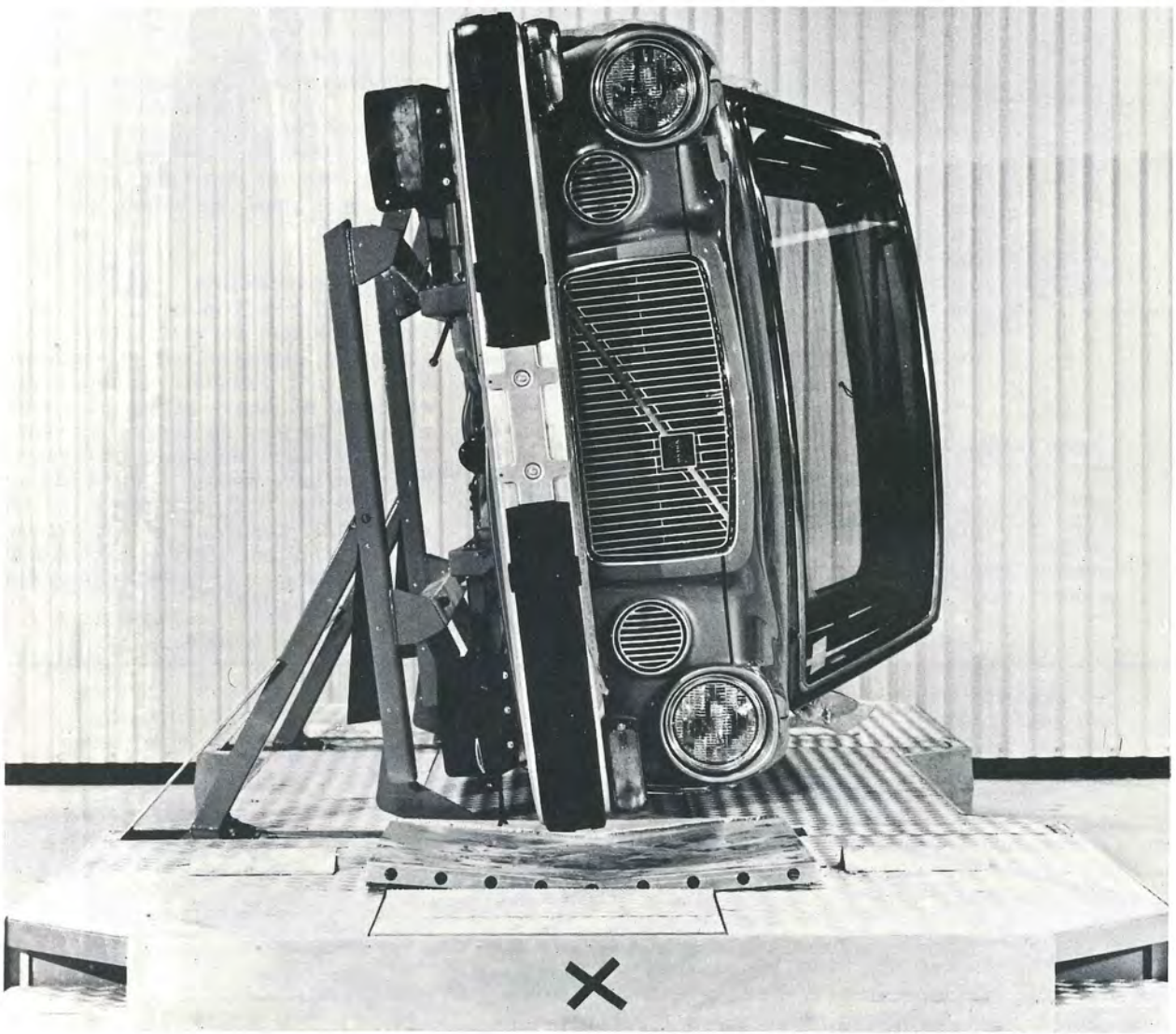
A tale of three factories

Volvo has just opened a startling new engine works at Skövda. The company's car assembly plant at Kalmar has already become a landmark in the use of technology to eliminate assembly lines and improve working conditions. But what about older car factories?



A tale of three factories

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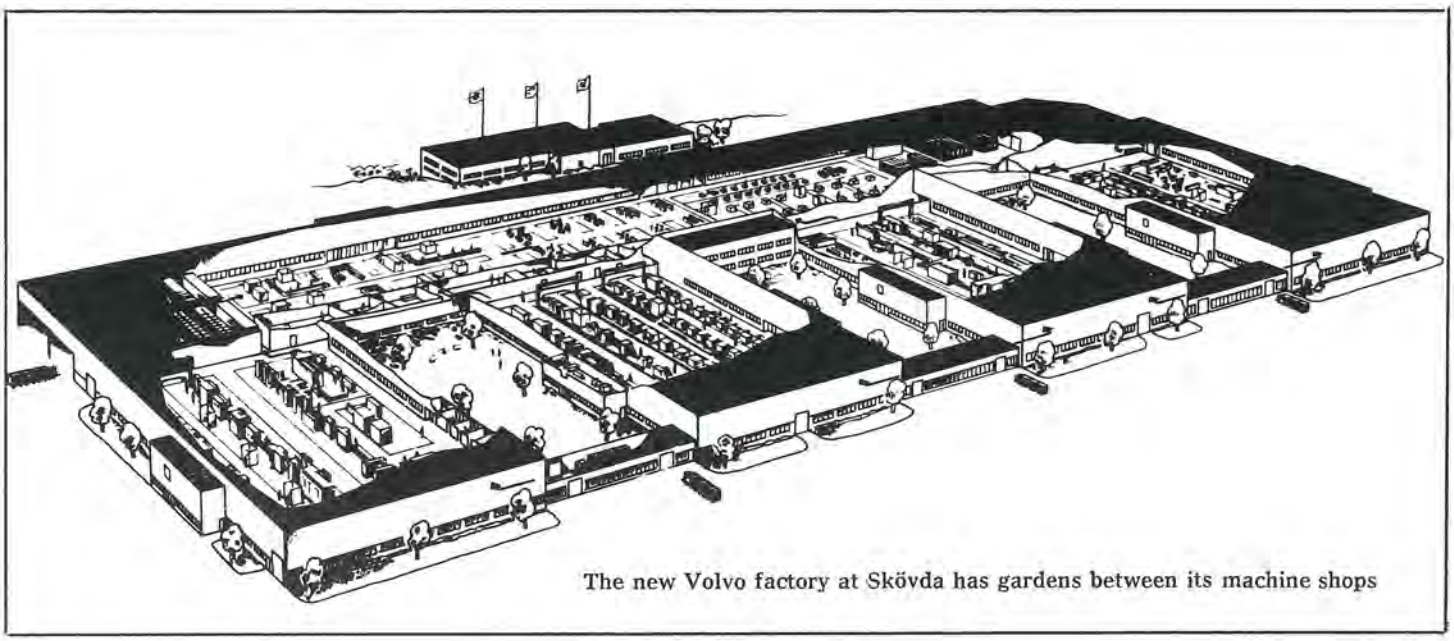
"When you can change the production technology, then you have a chance to get the flexibility that makes it possible to organise work differently." Volvo's 39-year-old president Pehr Gyllenhammar agrees that change is easier in a new car factory than an old one. He also grants that Volvo's higher quality, lower volume approach sets it apart from other manufacturers. On the other hand, the company's pre-tax profits were 8·2 per cent in the first half of 1974, at a time of rapid expansion in a very soft car market, so he believes Volvo's investment in better working conditions pays off in better cars.

On 24 September, Volvo officially opened its new engine factory at Skövda (pronounced Shove-da) in central Sweden. The Skövda works uses a number of different kinds of technology to achieve good working conditions, as does the other new Volvo plant at Kalmar on the Baltic coast, which opened early this year. The various aspects at Skövda which Volvo categorises as "technology" include plant design and layout, automatic handling devices, electronic control of machining and assembly procedures, the use of group instead of line assembly, and, allied to this, electrically powered carriers for individual engines going through the assembly process.

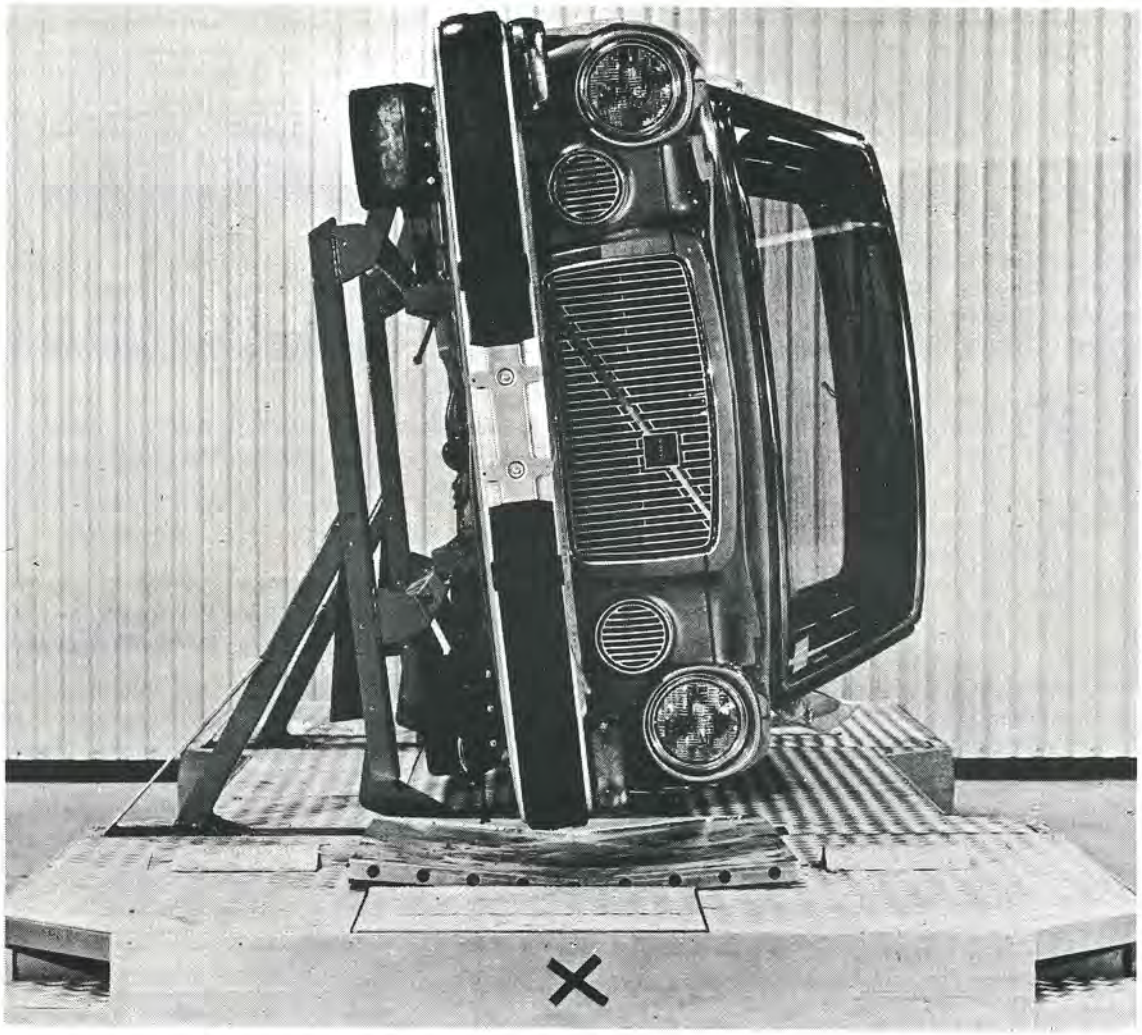
The plant design at Skövda, like that of Kalmar, is airy and pleasant, but there the direct resemblance stops. Gyllenhammar insists that each factory has its own set of problems and must therefore have its own solutions. Kalmar is in the form of three overlapping hexagons, with two floors of assembly areas organised with one 20-man group along each of the outer wall sections and a two storey storage and delivery area for parts at the centre. The Skövda building has one long leg and four short ones, each containing one of the four machining departments. Thus each short leg has three window walls, and between them are green garden areas. The long leg contains the assembly areas, soundproofed from the noisier machining areas. Thus the plant contains 40 000 square metres of floor space, yet it retains the feeling of small workshops. In addition to the soundproofing, the design itself keeps working noise from one department from invading another, and all the highly automated machines were manufactured to Volvo's extra-stringent noise specifications as well. Each working group has its own coffee area, and there are larger recreation rooms adjacent to each greenbelt. Air, noise and temperature control are the best and latest, and many machines have individual air circulation systems.

Women on the line

No matter how beautiful a factory is, the work itself may remain soulless. Volvo takes the sheer drudgery out of working life at Skövda with automatic handling devices to eliminate all heavy lifting. This means that physical factors no longer prevent women from working in most jobs, and the company's goal is to have women in about 40 per cent of the eventual 1000 jobs, when the factory is up to full production of 275 000 engines a year. (At present, there are about 400 people, and production is at 60 000 engines during the running-in period.)



The new Volvo factory at Skövda has gardens between its machine shops



The Kalmar carrier eliminates work underneath the car

This trend to bring women into the workforce is strong in Sweden generally, partly because labour shortages are growing. (About one-third of the workers in Volvo's other Skövda plants are foreigners, though a high proportion come from Finland, which is within the Scandinavian free-labour-exchange area. However, Finland is now experiencing its own industrial boom and advertising in Sweden "Finns, come home".) Volvo has for several years tried to broaden the number of jobs available to women, to the extent of encouraging two women to share one job; three to take one two-shift job; or groups to make other part-time arrangements among themselves. Although this complicates training and job rotation schemes, absenteeism among such part-time workers is demonstrably lower than average.

In addition to the lifting devices, the new Skövda factory has electronically controlled machining and assembly procedures, such as automatic positioning of shims to give the correct valve clearance; the machine chooses the correct thickness from a magazine holding 32 different shim sizes. Overhead camshafts are then assembled automatically and the valve clearance is also rechecked automatically. Other machining departments are similarly automated. The company says a new system of diagnostic equipment allows operators to check their own work. They also handle set-up and replacement of their tools and do their own material handling, so a "machine operator" rather than a mindless machine-minder is now a full-fledged member of a team in each machine shop, with a markedly enriched job.

Workers' control

The key to Volvo's team assembly at Skövda is little T-shaped carrier, about the size of chair, that collects and carries all the parts for engine assembly. The carriers follow magnetic loops in the floor, stopping automatically in positions the workers themselves have programmed into the guidance system. A worker can also run the carrier outside the programmed loops by using a manual override feature if he (or more likely she) desires. The carriers have special positioning devices to turn the engine block around two axes. Team members can work individually or together on a single engine, as they choose, changing the duration of a task anywhere from three to 20 minutes.

The Kalmar factory has already used (and patented) this carrier concept, and other car makers visit regularly with an eye to licensing it. The Kalmar carrier is on a much

grander scale—just as cars are larger and more complicated than engines. The Kalmar carriers are large, flat platforms—big enough to hold an assembler as well as a car—which have devices to turn the car on its side for work on the bottom. Another model for chassis work raises the work level to suit the worker or mate the chassis with the body. Both carrier types glide silently around the Kalmar floor and up and down its lifts like ghostly servants, under computer control. Information from all tests is fed back to the cluster of small computers (Digital Equipment PDP-11/40 systems), which schedule each car for its next destination according to the test results. Thus a paint scratch that occurred at the mating of the body and chassis is reported from a terminal on the spot, and that carrier quietly carries its car off to the paint shop at the optimum time in the production cycle.

Workers can override the central computer from their terminals in each area, and even the terminal can be overruled by using manual pushbuttons on the carrier itself, which is battery-powered for use off the electronic guidance system. If a carrier glides into an obtrusion (like a visiting journalist) it stops immediately (and painlessly). Kalmar has about 275 of these expensive but impressive devices. The carrier has been streamlined and simplified for use in Volvo's new assembly plant in the US, due to be opened next year.

Like Skövda, the Kalmar factory emphasises team assembly, with jobs organised functionally, so a worker is a "door expert" or an "electrical system worker" rather than a mere "auto assembler". Two teams of about 20 each share a single foreman, not to mention a sauna, a coffee room, several meeting rooms, and a production engineer. This approach flattens the traditional management structure considerably (and waters down the dominance of the technical experts) and replaces many supervisors with "instructors" working with, rather than above, each team.

Torslanda's task forces

Team work, although it gives the individuals obvious "benefits" of membership and a sense of identification with the product, is not so easy to achieve in an older factory that is already tied to the almighty assembly line. Volvo's huge Torslanda works at the company's headquarters in Goteborg is 10 years old. It is pleasant and new by car industry standards, but vastly bigger and inherently less flexible than the sparkling new little factories at Kalmar or Skövda. Even so, the company has managed to improve jobs at Torslanda for its 8000 workers (average age 29; about 20 per cent of them women). Training beginners now takes 10 days to learn at least three different assembly tasks, rather than the three-days/one-task initiation that existed before. About 2500 people involved in project groups or task forces of various kinds, usually five or six man groups that initiate changes in the work or the environment through the union/works council structure.

Over 1200 Torslanda employees have chosen to learn new tasks so they can enjoy job rotation. In the body shop, for example, the adjustment area has changed from a 16 man line with two inspectors at the top and two at the bottom, to groups of five each with its own inspector (usually a woman). Each group does all the necessary repairs and checks to a single body. "The paint shop told me we were doing much better," says one adjuster proudly. Competition between the four major departments at Torslanda (pressing, body work, paint, and assembly) seems to be tacitly encouraged, since it increases the sense of membership and the pride in quality that the company wants in all its plants. Torslanda has also imported several ideas from the new factories—for example, the carrier mechanism that turns the car body on its side during assembly, eliminating work underneath.

Proud of independence

Volvo is a very independent outfit, proud of its ability to do most of its expansion through self-financing. (Softening of the car market, if it continues, may cause some stretch-out, diminution, or outside financing—or all three—for the company's announced plans to spend about £500 million over the next five years on new or improved facilities.) Shareholdings are widely spread, and in a country whose industry has traditionally been dominated by few families, Gyllenhammar asserts that Volvo has been free from dominance by any one group since its formation in 1927. Today, the basic premise of the company seems to be: "We like to be independent and make decisions for ourselves, so we assume our employees do, too." In a country noteworthy today for its emphasis on industrial democracy, the question of whether Sweden's largest employer and taxpayer has influenced the national ethos, or vice versa, is an interesting one for academic contemplation. Fortunately, for Volvo's employees, Pehr Gyllenhammar seems to prefer to keep his contemplation focused on how to make it work.

Looking at his collection of old, new and nascent factories, Gyllenhammar emphasises again that Virginia will be different, too. "We will not end up with the Skövda solution or the Kalmar solution; it will probably be a third alternative." I asked how he saw the role of management in this change; his model seemed to be that of a catalyst. "If you are a supervisor experiencing the situation where people don't turn up in the morning, you grow more willing to change. Numbers are important and the supervisor has to produce the numbers. You wonder every day if you have 15 or 20 per cent of your workforce to replace. Live through *that* situation for a year, and pressure builds up, with considerable force from the bottom. Then if you add pressure from the top you seem to get change more quickly than the normal culture would permit. In the mid-1960s there weren't many managers who would support what we are doing now. So we have moved a long way from the attitudes we had ten years ago."