



The 164 carries on the Volvo traditions of quality and conservatism in design, though this latter characteristic may not endear the car to a wider European market since interior space is the same as for the 144 cars and performance not much better than for the twin-carburettor version of the less powerful models. Older houses, like the one in the background, are often built of timber.

IT wasn't the lavish Volvo hospitality or the brand of Swedish schnapps described as "potato-juice" by PR man Johan Hallenberg that changed my ideas about Scandinavia's foremost motor manufacturer, nor even the famous Swedish birds. I was enlightened instead by what I saw on my recent visit to their main Torslanda works near Göteborg and to their engine works at Skövde, by things like bearing inspection, landscaped offices and ventilated sills. I had hitherto always thought of Volvo as being a small, individualistic manufacturer, very much going its own way, with almost fanatically loyal customers—a sort of Swedish Lancia, in fact. Though there's little doubt about the intense loyalty of Volvo owners, this is a less than accurate view in other ways as I found out. For one thing Volvo make 170,000 cars a year, (compared with Lancia's 40,000) for another they have just beaten SKF into first place on turnover to become Sweden's biggest industrial group. That's not just Volvo cars, of course, but the Volvo Group which also builds heavy trucks and commercial vehicles and which includes separate factories for engines, transmissions, forgings, truck cabs and other components as well as an earth moving/agricultural machinery company (Bölander-Munktel), Volvo Penta, making industrial and marine units including outboards, an aero engine company (Svenska Flygmotor) whose products include jet engines for the Saab Draaken, and a recently taken-over steel pressing company (Olofström).

Nor is the company content simply to maintain its position: already an extension of the

Volvo rolls forward

The survey on the preceding page suggests that Volvo are unusually meticulous manufacturers.

Anthony Curtis has been to the factory in Göteborg to probe their attitudes on design, safety and production.

Skövde (rough pronunciation: "Sheroder") factory has been opened for the manufacture of the six-cylinder B 30 engine of the 164 which will have annual capacity of 40,000 units and Volvo intend to increase total output to 275,000 cars a year by 1975. This will mean the further expansion of many existing factories as well as the construction of several new ones, and plans include the building of a new Technical Centre for research and Development on the Torslanda site and a new test track not far away.

Design and safety

Such success has depended largely on selling abroad—Volvo's export share of sales has increased from 39% ten years ago to 58% in 1968; how has it been done? Not by advanced design or technical innovation as the 144 showed and the 164 confirms, for Volvo tend to be conservative in their approach to such matters. This conservatism does not derive from any inertia or lack of imagination in the top management but is a definite policy. It was defined by Mr. Gerhard Salinger, (Volvo's Chief Safety Engineer), when I asked him why the 144 had not been provided with independent rear suspension: "We believe in a fairly conventional approach—if we can achieve our design goals, of course. It makes for a more reliable design which gives less trouble to the customers. You can see it from our engines: there are no overhead camshafts because most designs are a little bit cumbersome to adjust. They're not always quiet and we're happy with the

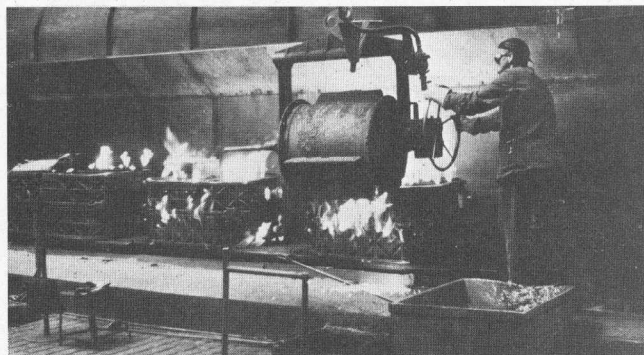
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Volvo hall—used for receiving guests at the Torssländ works. Inside is a lavishly equipped lecture theatre.



How an office should look: the "landscape" offices at Torssländ



A casting operation at the Skövde plant.



All plain bearings are tested before assembly.

torque we can get in more conventional engines and with the maximum output that's available."

The point here is to recognize the powerful influence of environment on design. This emerged again as our discussion continued: "Nearly all independent rear suspension systems," Mr. Salinger went on, "I'm excluding the de Dion—do give some camber and track changes, and we've found that this is not what we like on an icy and slippery road. We've always found that this gives worse traction. If you want a more advanced design than ours for icy roads, then I would suggest the de Dion system, the Rover or the new Opel Diplomat".

After discussing in detail the ride and other advantages of independent rear suspension Mr. Salinger wound up his argument against such systems by saying: "If you go off the road, which in Sweden you do fairly frequently in winter—you have to sometimes because snow walls restrict road width—and you need to repair the running gear, an IRS system is very, very, difficult to adjust."

The virtual inevitability of the occasional collision with a tree or other solid object during a winter of Swedish motoring—and the car which Volvo devotes to these matters—is confirmed by their five-year insurance scheme. Anyone who buys a new Volvo is covered for five years against collision repair costs (incurred in Sweden) exceeding 400 Kr. (about £32)—third party costs are not included. This scheme works well and Volvo do not lose money on it.

But accidents are not the only cause of damage to cars: corrosion is another great problem especially in Sweden where large quantities of salt are used annually to keep the roads clear. For this reason Volvo go to great lengths to ensure that their cars are durable as well as strong. The sills, or box-section side-members of all 120 and 140 series cars, for example, are ventilated with fresh air from the bonnet intake. In this way water is swept out through the drain holes and the vulnerable interior of the sill kept dry. Conventional but exceptionally thorough rust-proofing measures complete the protection. Welded areas—where corrosion is more likely because of the galvanic cell created by differences in materials composition—are given additional coats of sealant or primer before the main coats. Excluding the two coats of undersealant, the total weight of paint is about 33 lb.

Environment also has a lot to do with Volvo's interest in safety—they were selling cars fitted with two safety belts as standard in

the days when Ralph Nader was still in law school. In 1967 the company published an analysis of 28,780 accidents to Volvo owners based on information derived from their five-year insurance scheme which showed the importance of wearing safety belts; their experience and knowledge of safety matters has had a considerable influence on the American Federal safety regulations. Some idea of the depth of thought involved can be derived from Mr. Salinger's answer to my question about the problem of child safety in Volvos:

"If you have no special means of protecting a child, keep him in the rear seat of the car—no child should ever be allowed to ride in the front. The front seat of the car is the dangerous seat. Keeping the child in the back is the best you can do without special ways of protection but these are extremely difficult to devise. His little body can't take the strain of conventional safety belts. The head is heavy in proportion to the body—much heavier than for an adult—which means that you can't harness a child in the normal way because of whiplash effect. The only effective approach we have found is to turn around the front seat—this can be done quite easily in most Volvos. Then we add an aluminium shield to the seat back and fit a lap belt which merely keeps the child in place. In a frontal collision the head is supported and the forces are distributed over the child's back; in a rearward collision—usually less severe—the lap strap gives some protection. That's the best approach we've been able to find. But we have to admit, of course, that you have to decide one way or the other: you can't turn the seat around, fix the insert and take it out again after two hours—that just won't do."

Even the most careful of English families is unlikely to tolerate the inconvenience of such an arrangement just for increased safety when baby is taken on the occasional trip to the shops. But the attitude changes sharply when young Lars has to be carted back and forth along 15 miles of snow covered road each day when Mum collects his elder brother from school. Out of such conditions the Volvo safety studies have grown.

Quality

Volvo production engineers are mad about quality. They get it not so much by assigning so many inspectors to each man on the line but by making each man his own inspector through careful education and propaganda. This technique works well when the parts are being made by Volvo themselves, as nowadays most of them are. All the major steel pressings, suspension systems, engines and transmissions including the live rear axles are made in Volvo factories. By comparison many British cars use bought-out live axles, so although Volvo like to think of themselves primarily as being assemblers of other people's parts this is less true than it may have been some years ago.

Nevertheless, like most other modern manufacturers Volvo do use many bought-out components, quite a few of which are British—to the tune of 900 tons a week and £18 million annually. British parts used include brakes, drive shafts, universal joints, wheels, carburettors, overdrives and many others.

Components acquired in this way from firms all over Europe are subjected to a rigid quality control and inspection programme. A lot of the hard work involved goes into liaising with the outside producer to make sure he manufactures to the quality level required. But virtually all parts received at the factory are inspected in some way, either by sampling or on a 100% basis. All plain bearings, for example, are inspected for as one Volvo engineer said there are around 30 possibilities of a fault in a six-cylinder engine when you count up all the half-bearings used: 12 mains 12 big-ends and so on. At Volvo they don't like to take such chances.

Ways and means

Volvo's greatest asset may perhaps be a rational or conformist streak in the Swedish national character. The inter-union battles still going on in Britain are very much past history in Sweden where all motor industry workers belong to one union, the metalworkers union. Agreements made between employers and

this union are legally binding on its members who are fined for unofficial strikes—which are rare. The progressive attitude of the workers can be gauged from the fact that one union—in another industry—has invested its strike fund in modern works of art—and has an arrangement with a bank to use them as security for a loan if the need arises.

In Sweden, too, companies may divert a proportion of their profits to a tax-free investment fund from which they can—with government permission—subsequently draw to finance expansion programmes. Nor are there generally great planning permission difficulties when factory sites need to grow: Volvo's chief opponent for some years when they wished to extend their Skövde plant was not the local authorities but the Swedish Army who occupied adjacent land.

But to these inherent advantages Volvo have added a good deal of the best sort of management expertise. They use, for example, an up-to-date job assessment method borrowed from America, known as "MTM". This was craftily introduced at the Skövde engine works, starting in parts of the factory presided over by right-wing shop stewards favourable to it. As it became apparent that the method brought gains for both management and labour, the few communist union members accused the communist shop stewards of failing to protect their interests so that none were returned to office when the time for election came.

An even more impressive evidence of the Volvo management's attention to detail is to be found in their fabulous "landscape" offices at Göteborg, which significantly perhaps, are similar to those at Lotus. Open-plan in concept, each department is grouped together in islands. Every member of a given team is able to identify himself with the overall task, communication is easy—you have only to raise your voice a little—yet noise is kept down to a discreet murmur.

The name "Volvo" is derived from the Latin verb meaning "I roll", and it is little details like this that may make it possible for them to roll a little further than their rivals.



Driving impressions of the Volvo 164

most of the intake roar prevalent on four-cylinder Volvos in the mid range. It is coupled to one of the best manual transmissions we have encountered on a large family car, with an unusually crisp change by a very short central lever, and has extremely powerful synchromesh. Two options on our test car were overdrive, operative on top gear only, and power-assisted steering.

The steering is quite good as worn and roller power systems go, with a reasonable amount of response and sensitivity in the straight-ahead position. It has a variable ratio to make it lower geared on full lock, which might usefully ease the effort of parking the manual model but serves little purpose with power assistance other than increasing the amount of winding required. Most of our drivers found the suspension a little too soft for their liking with a rather rapid onset of roll when cornering hard but the ride is very good and, though 14 cwt. of its 25 cwt. kerb weight over the front wheels ensures a fairly marked understeer, the 164 can be hustled through country lanes with quite considerable verve for a car of its size. Apart from some low speed tyre thump and occasional unexplained clonks from the transmission the car is extremely quiet and relaxing to drive for long distances. We will publish a full Motor road test in about a month's time.

Traditionally, Volvo buyers know what they want; a robust and durable car, safe and comfortable to drive, free from fancy frills and gimmicks with a clean, timeless but conservative appearance, staid if not exactly uninspiring. It is to their credit that the firm has succeeded so well in meeting these comparatively difficult standards with a four cylinder engine of modest capacity. How much easier it becomes with the smooth, refined six cylinder engine of the 164. It is a car which impresses immediately as being what a Volvo always should be but never quite achieved in the smaller models.

Though the wheelbase is only 3½ in. longer than that of the 144, with which it shares several body panels, the longer tail and extended bonnet, with its rather dated vertical grille, give a much more opulent appearance. The driving position is comfortable; the seats, upholstered in real leather, offer ample adjustment and good support for

the thighs and hips besides the adjustable lumbar support controlled by a knurled wheel in the squab. Apart from certain important omissions such as face level ventilation and flashers which were not self-cancelling on the car we tried, the interior is very good and looks even better finished than the price, starting at £1,830 for the non-overdrive manual gearbox model, would suggest.

The 3-litre engine, developed from the normal 2-litre four by the addition of two cylinders, gives 145 b.h.p. (gross) and has an adequate if unsensational performance. The Zenith Duplex exhaust emission control system is standard and though its influence on air pollution is of academic interest in Britain at the moment, it seems to assist towards good starting, low speed flexibility and rapid throttle response when accelerating. When pressed to its rev limit, the engine begins to sound a little fussy but has lost