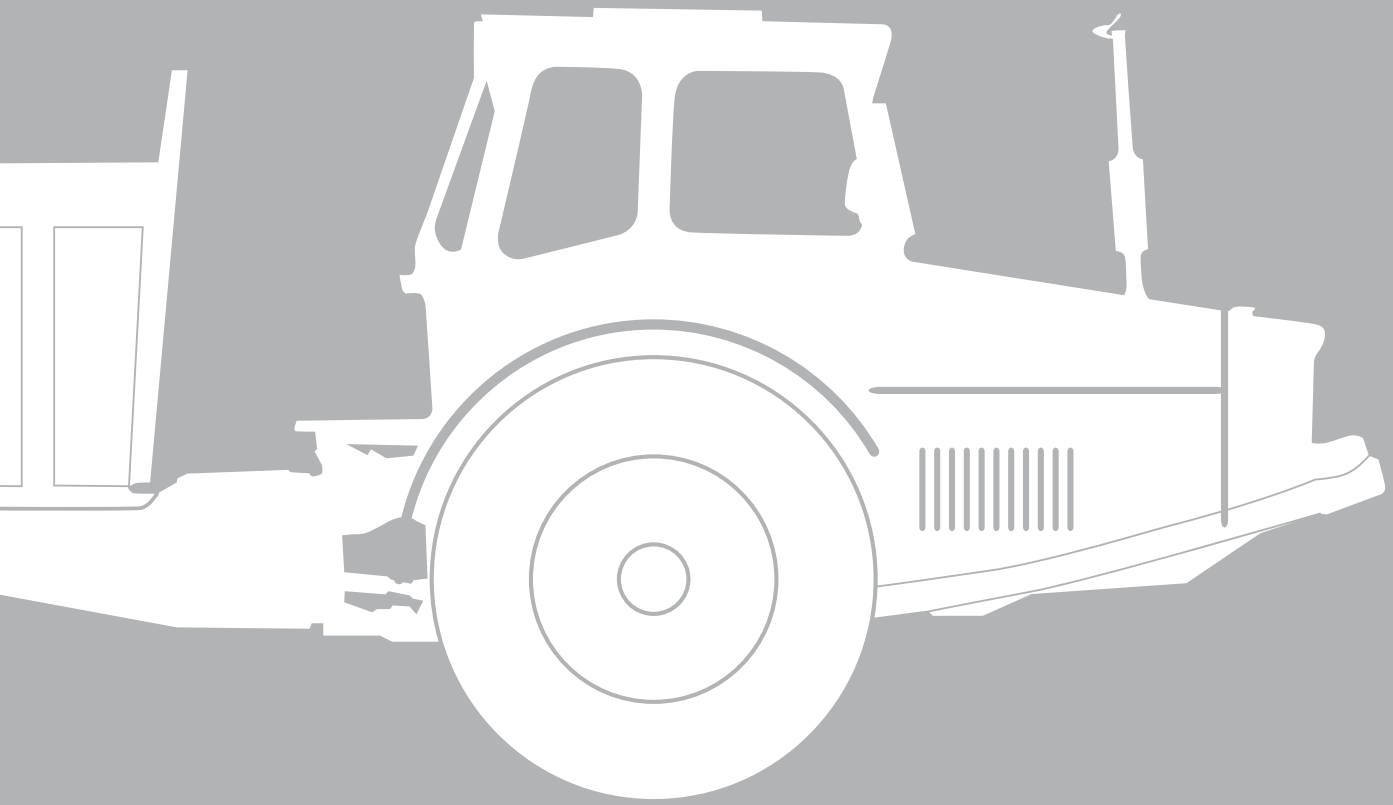
BEING THE FIRST
KEEPING THE LEAD



1966–2006

VOLVO


40
YEARS
50 000 UNITS
Volvo Articulated Haulers

PROLOGUE

When the workshop company Livab in Braås signed a cooperative agreement with Bolinder-Munktell in 1965, it was the very beginning of the success for Volvo Articulated Haulers.

The agreement covered manufacturing, sales, and marketing of a unique off-road machine, the new articulated hauler DR631.

When DR631 was introduced in 1966 it was the world's first series-manufactured articulated hauler with all-wheel drive. Some regarded it with doubt and scepticism, but the idea would come to prove itself in the long run.

Today, five of ten haulers in the world are made by Volvo. 98 percent of Volvo's production is exported to customers in close to 100 countries.

In other words, the articulated hauler concept still proves its worth after 40 years and 50,000 produced machines!

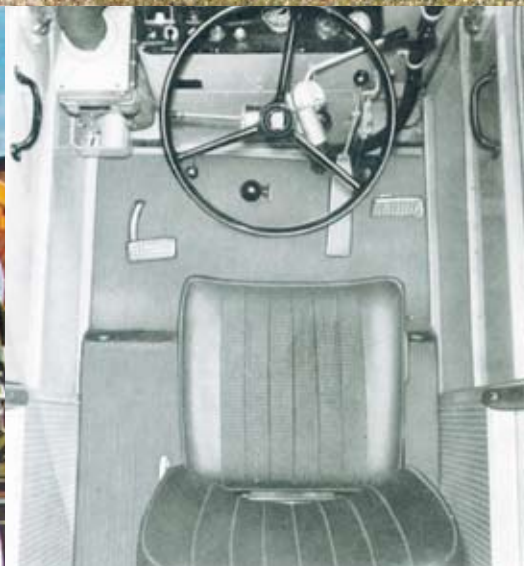
Volvo Articulated Haulers
40 years of leading innovation!


BM VOLVO


BM·VOLVO
DR 631


BM VOLVO


BM VOLVO



BIRTH OF THE ARTICULATED HAULER

At the end of the 1950s, Livab and other companies were experimenting with combinations of driven hauler trailers and tractors. But, some of the basic problems were still not solved. There was still a need for a separate transmission on the trailer, since the tractor's power take-off was independent of the drive-wheels. That made it difficult to get the drive on the trailer wheels to match that of the tractor wheels at large steering angles, which in some cases resulted in quite short life of drive axles.

Another problem was manoeuvrability, something that became obvious when Livab at the beginning of the 1960s attempted to develop a forestry machine with a crane and load unit.

The problem was solved at the kitchen table in the home of an employee, Wiking Björn. Since the tractor's front wheels easily slid in snow, he simply started to sketch a tractor without front wheels, with articulated steering and drive on the load unit's wheels.

Carl Lihnell, Livab's owner, got all fired up. He gave Wiking Björn and workshop manager Elis Karlsson the task of developing a prototype. All took place in utmost secrecy and, after three months of intensive work, it was done.

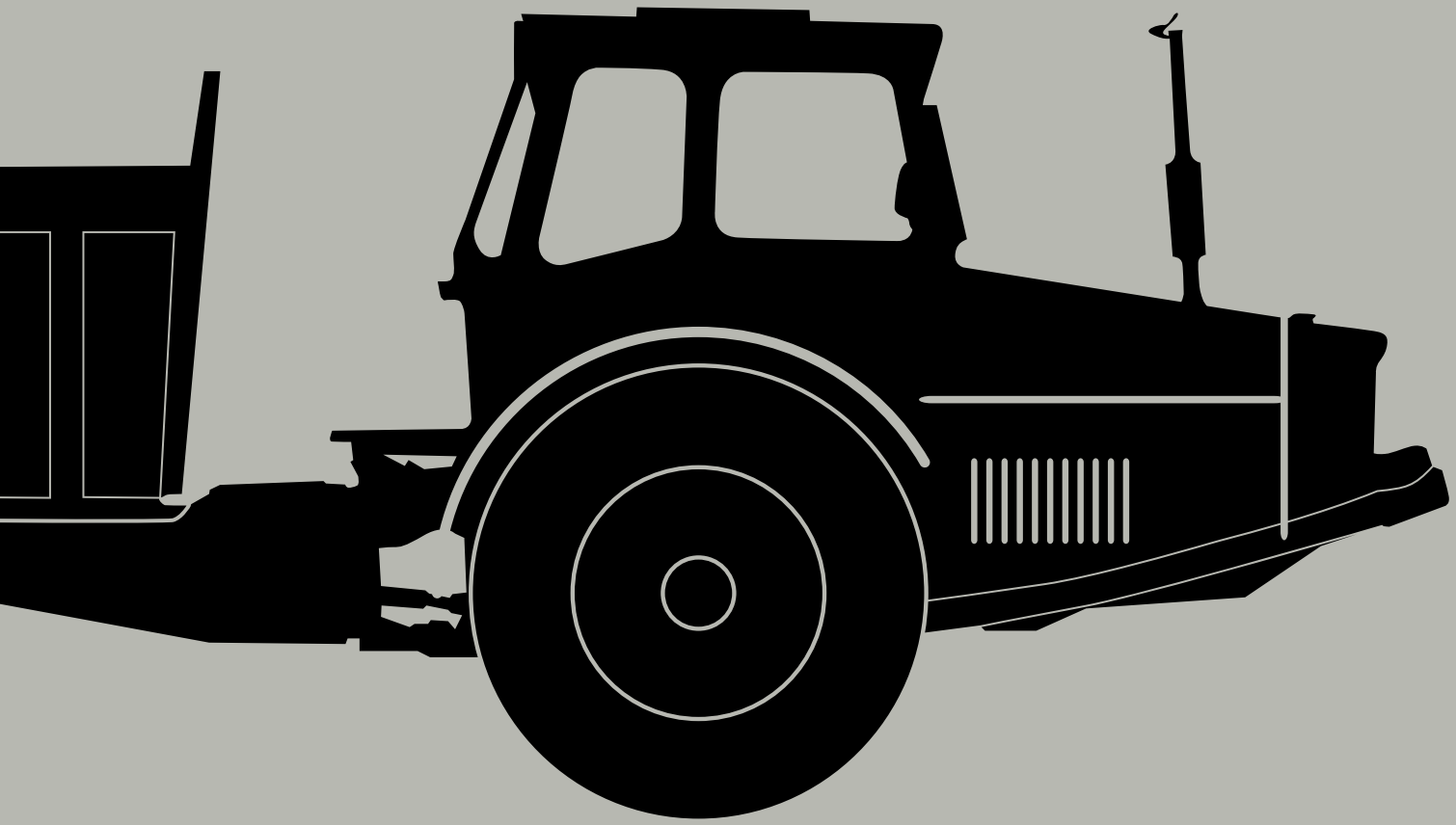
One night, in the cover of darkness, the machine was test-driven – and it worked!

The new machine SM665, or "Timber-Charlie" as it was called after Carl Lihnell, had a lot of new features and was similar to today's harvesters: four-wheel drive, articulated steering, a sturdy and insulted cab, the crane was mounted on the trailer, the crane's controls were in the cab, and the trailer was equipped with big tires.

The successes of the forestry machine spawned the idea of developing a machine with a dump body trailer. And there was a great need. Road building and the construction boom of the 1960s demanded equipment that could transport large amounts of earth, rock, and gravel. Often short distances, but in tough conditions.

The solution was DR631, the world's first series-manufactured articulated hauler, and the start of a concept that would conquer the world.

1966 – DR631 (”GRAVEL-CHARLIE”)



- Engine: BM 1113A, 65 hp
- Payload: 10 tonnes
- Load capacity: 6,5 m^3

According to today's standards, the world's first series-manufactured articulated hauler was quite modest. Its greatness was found in the basic solutions that still prove themselves to this very day: articulated steering, all-wheel drive, and differential locks. It gave unbeatable manoeuvrability in rough off-road conditions, among others, it was possible to use "duck walking" on very soft ground: by steering alternately to the right and to the left, the machine moved ahead.

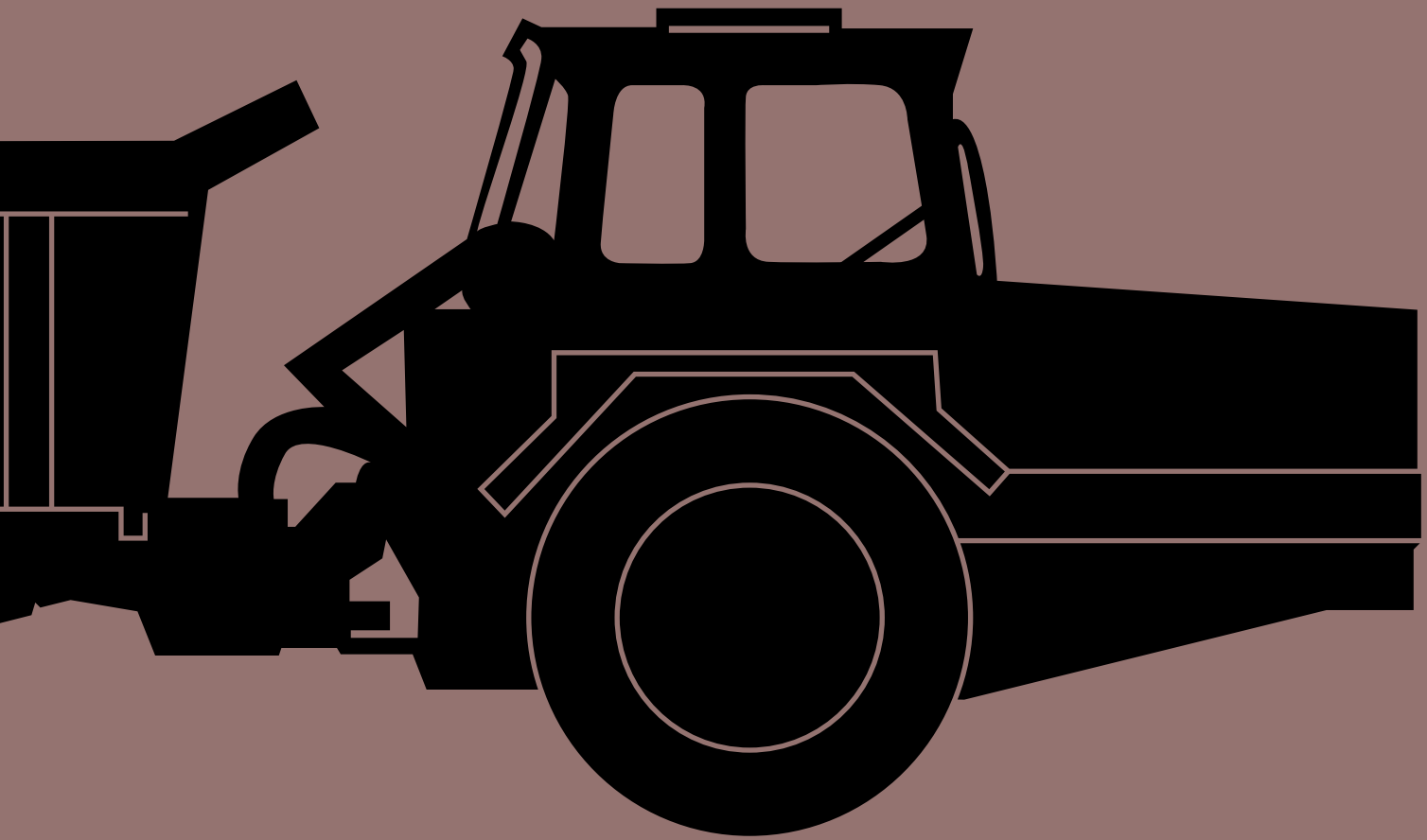
DR631 was based on the classic tractor Volvo BM350 Boxer. And it was a technical innovation a few years earlier, the drive wheel-dependent power take-off, that made the articulated hauler possible.

The introduction of "Gravel-Charlie" was the beginning of something completely new, and many realized that the hauler would radically change the conditions within the transport industry.

The hauler concept proved itself, but the DR631 was not enough to attract a larger market than Sweden and the Nordic countries, and development work continued with undiminished efforts.

DR631 wasn't big, and it wasn't powerful – but it pointed out the direction to a revolutionary hauling solution.

1967 - DR860



- Engine: Volvo D50, 110 hp
- Payload: 16,7 tonnes
- Load capacity: 11 m^3

In May of 1968, the DR860 was launched at the Expomat exhibition in Paris. The same time saw the outbreak of the student uprising that would shock the French republic and spread left-wing sentiments throughout the west.

After three days, Expomat had to be closed ahead of schedule due to the unrest – but there had been time to introduce the DR860 and it received well-deserved attention.

The new hauler was based on the revolutionary basic concept from DR631, but this time a wheel loader was used, Volvo LM840, for the tractor. The load capacity had increased to 15 tonnes and it was equipped with a bogie, giving maximal smoothness on uneven ground.

With the DR860 began a focused export effort, with start in Great Britain. The market's doubts and scepticism could only be beat in one way: by extensive demonstrations at different work sites where DR860 was presented as "The profitmaker".

DR860 became an enduring success. Different versions of the DR860 were manufactured until 1986.

VOLVO TAKES OVER – AND BUILDS A NEW PLANT

March of 1974 witnessed the natural continuation of the close cooperation between Volvo BM and Lihnell Vagn AB: Volvo BM assumed all shares.

This coincided with the international oil crisis, which also created some uncertainty about the future. However, the successes of the articulated hauler gave reasons to be optimistic. Production was at a peak and, of the 900 articulated haulers that were manufactured, 85 percent were destined for export.

But, a new and larger plant was needed to enable continued expansion. On September 11 1975, it was complete and was opened by the Swedish king Carl XVI Gustaf.

With the new plant, annual production could increase to 1,000 articulated haulers, with the capacity to step up the pace to meet increasing demand.

1979 – 5350 ("THE OFF-ROAD EXPRESS")

- Engine: Volvo TD70G, 213 hp
- Payload: 20 tonnes
- Load capacity: 12 m^3

Everyone knew what it was all about. Continued success required a bigger and faster articulated hauler. It was easy to say, but there were several problems that needed solutions.

In 1979, the result of the development work was presented on the island Jersey in the English channel: model 5350, combining both power and speed, was ready for series-production.

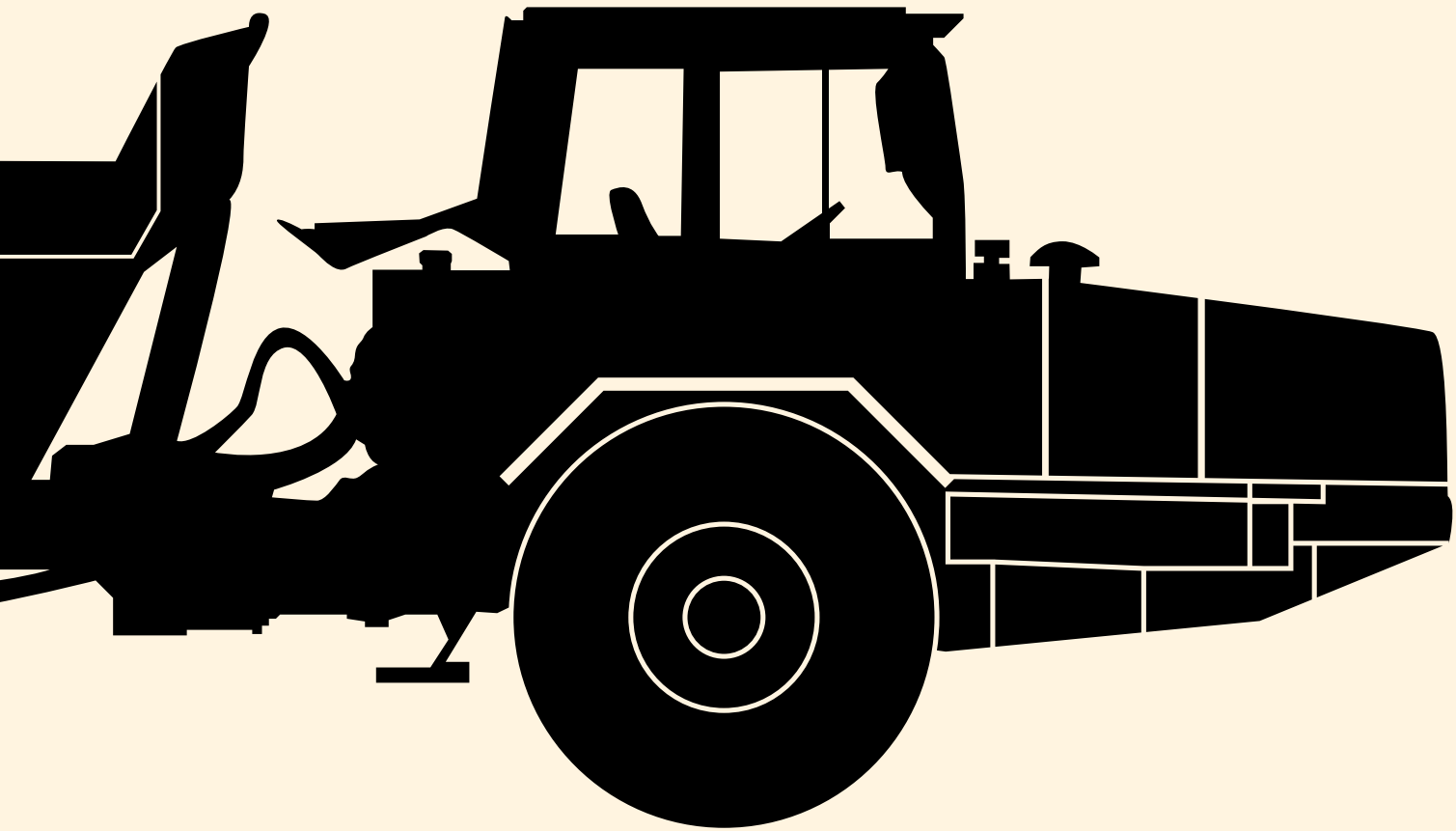
Soon it became known as "The Off-road Express". Nothing could be more natural, the 5350 had a top speed of 50 km/h, compared to its predecessors' 30 km/h. And higher average speed in combination with higher load capacity meant significantly improved profitability.

"The Off-road Express" was described as the Rolls Royce of articulated haulers. It had suspension on all axles, giving better operator comfort – an absolute necessity when machine speed almost doubled.

Other new features included selectable longitudinal differential lock, automatic transmission, and special tires with stiffer sidewalls specifically adapted to articulated haulers.

And development of the 5350 continued: a B-version was introduced in 1982, with new axles and disc brakes on all wheels. The following year saw the launch of the 5350 with six-wheel drive, and 1984 saw introduction of a machine adapted for mines and tunnel construction.

1986 – A20



- Engine: Volvo TD71G, 201 hp
- Payload: 18,5 tonnes
- Load capacity: 11 m^3

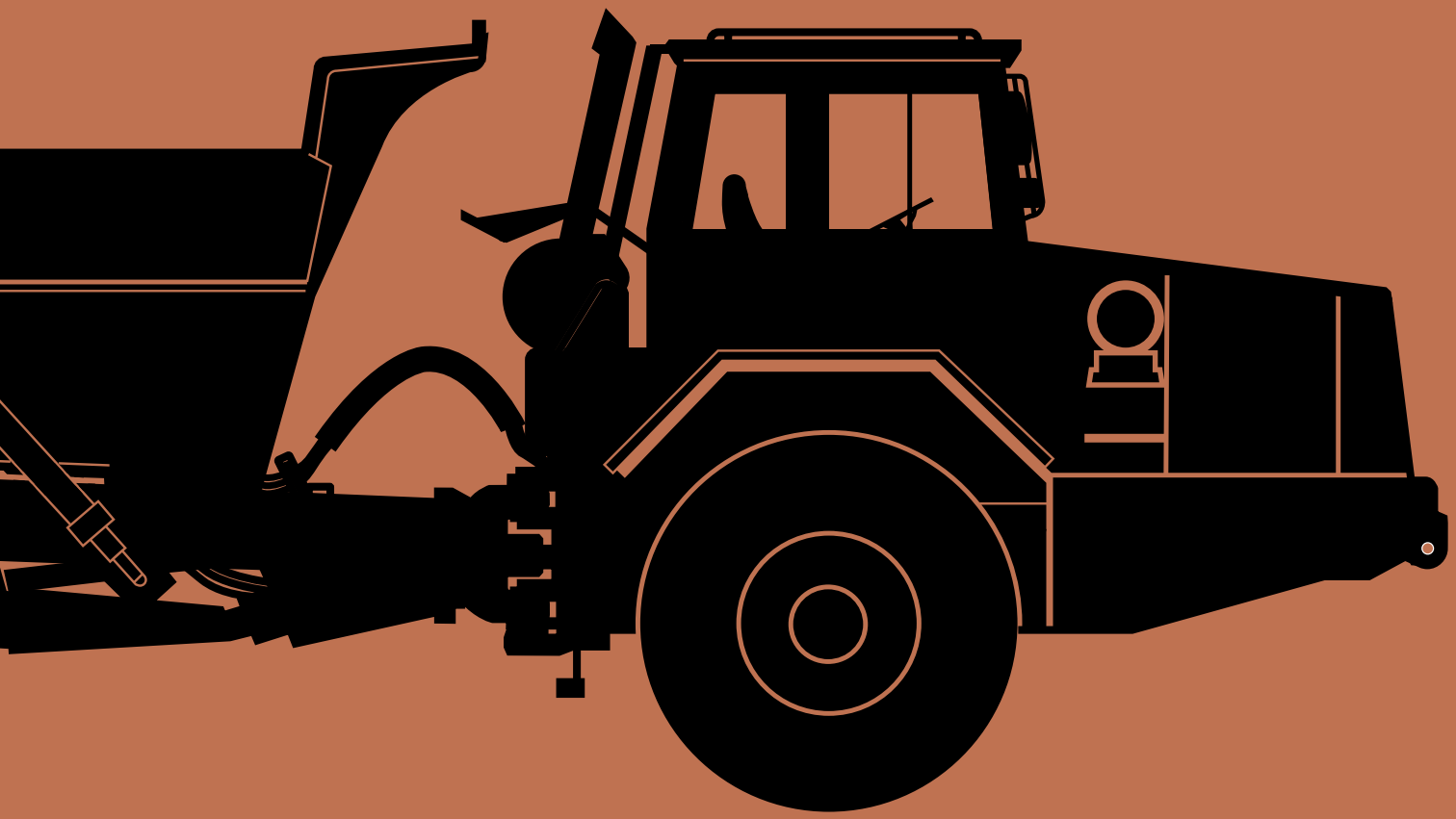
The second half of the 1980s was an intensive period within product development with several launches. Throughout the years, 11,000 machines of model DR860/861 had been manufactured. 1986 saw the arrival of its replacement and the first model in the A-series: the A20.

Compared to its predecessor the A20 had a much more powerful engine and a new improved transmission with electronically controlled automatic shifting. There had also been changes and improvements to the front axle, cab, frame, and the dump body.

However, the Volvo hauler's standout feature still remained from the DR860: the off-road bogie. Every wheel pair could move independently of each other, which gave extremely good manoeuvrability.

The 5350 "Off-road Express" was also updated and modified, and was renamed A25. It was equipped with a 240 horsepower Volvo engine and was available in three versions: 6x6, 6x4, and 4x4. However, the most important feature that had made the 5350 so popular and profitable, the speed, was still there. A25 had a top speed of more than 50 km/h, a great advantage compared to other haulers.

1987 – A35



- Engine: Volvo TD122 GA, 330 hp
- Payload: 32 tonnes
- Load capacity: 19 m^3

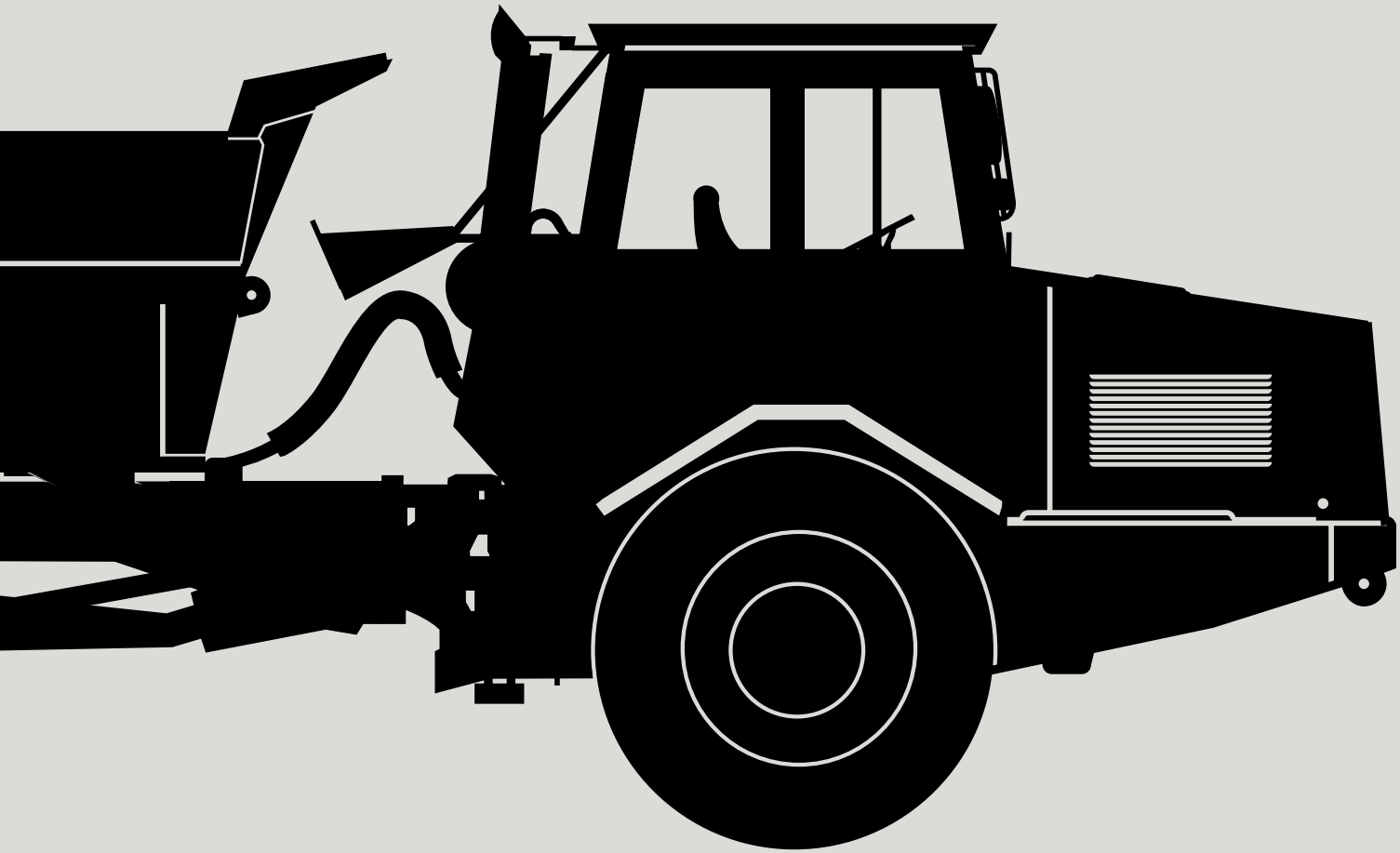
During the second half of the 1980s, there was a great increase in the demand for Volvo's haulers. Of course, the new model A35 contributed to the success.

A35 was the biggest Volvo hauler that had been built and was much awaited by customers with needs for high capacity and speed, for example, road builders.

It was equipped with a powerful six-cylinder 330 horsepower Volvo turbocharged diesel engine, power that was needed when operating with the max. load, 32 tons. And obviously, a top speed of 50 km/h didn't exactly decrease interest in the A35. It was also equipped with a hydraulic retarder, to maintain even speed on downhill grades.

With three different models in the A-series, the hauler concept was solid. The haulers were no longer only transport machines, they were ergonomically designed workplaces where operator comfort and safety contributed to the work result.

1993 – A25C



- Engine: Volvo TD73KCE, 251 hp
- Payload: 22,5 tonnes
- Load capacity: 13,5 m^3

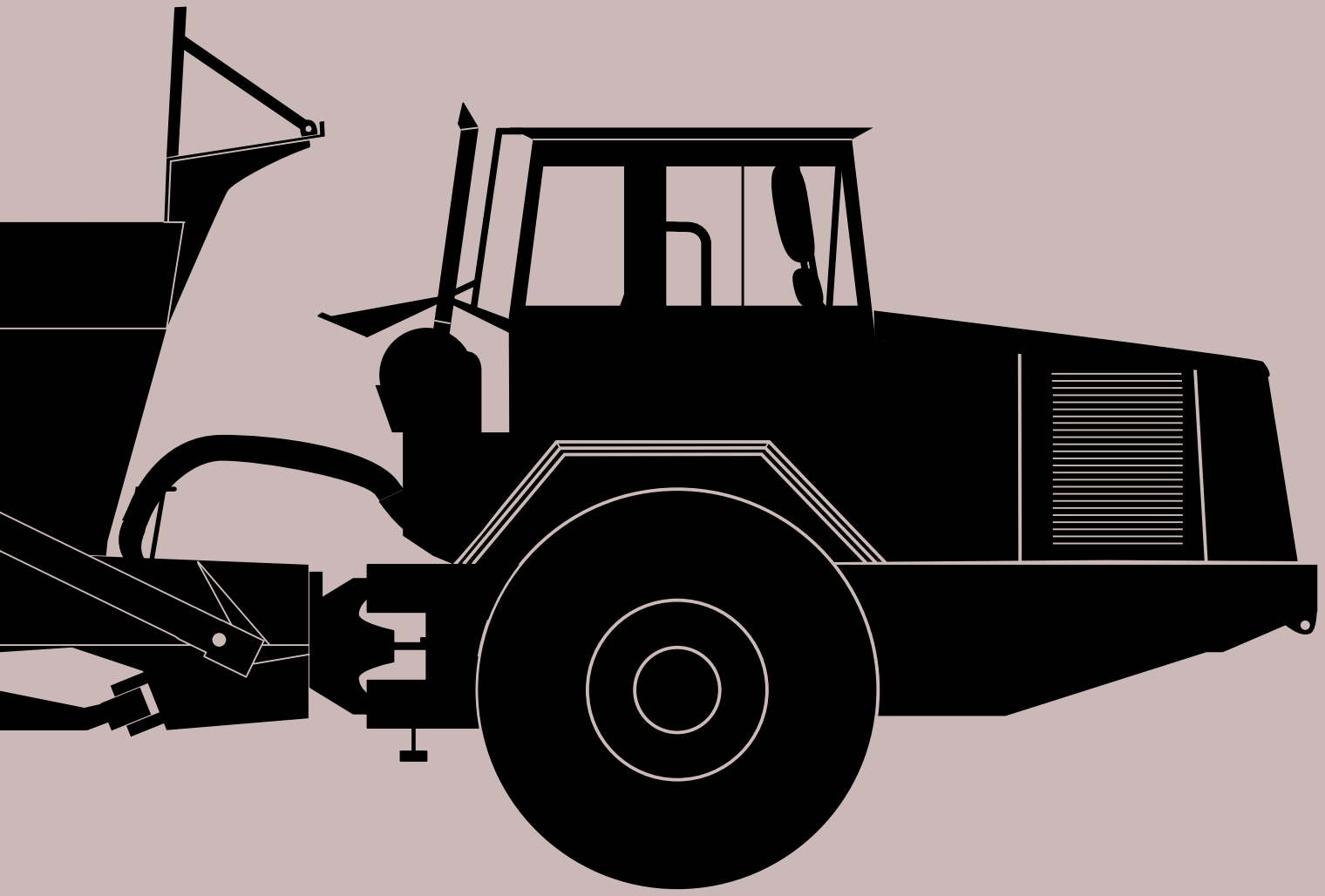
At this time, all numbers were up. The year before, 1992, Volvo celebrated manufacture of its hauler number 20,000, the construction industry recovered after an economic downturn, and Volvo's share of the articulated hauler market increased. Volvo had 65 percent of the European market and 45 percent of the American market.

It was the perfect time to go on the offensive.

A25C lead the way for a new articulated hauler generation from Volvo with profiled focus on quality, safety, and environment. A25C had a Volvo low-emission engine, with slightly higher power than the predecessors in the same class. Max. speed was 51 km/h and the transmission was fully automatic. The drivetrain had both longitudinal and transverse differentials that could be locked. A25C was available both as 4x4 and 6x6.

Two years later, in 1995, the C-series was completed with the production of the A20C, A30C, and A35C. The new generation meant that now all Volvo haulers were equipped with low-emission engines and suspension on the front axle.

1995 – A40



- Engine: Volvo TD122 KFE, 398 hp
- Payload: 36 tonnes
- Load capacity: 22 m^3

It became obvious in the early 1990's, the signals were clear: a lot of customers wanted a hauler in a class bigger than the A35, which was launched in 1987.

In 1995, the A40 was launched at the Bauma exhibition in Germany. It was an impressive machine in many ways. Eleven metres long, almost 3,5 metres wide, and it weighed 30 tons – without load.

This giant loaded 36 tons, and the engine – a six-cylinder turbocharged diesel engine with a 12 litre cylinder displacement – produced all of 398 horsepower. Max. speed was more than 50 km/h. Among other features, the brakes on this giant are worth mentioning – the A40 was equipped with oil-cooled wet disc brakes.

During this period, Volvo's share of the world market for articulated haulers had stabilized to just above 50 percent. The success stories spurred continued development of the successful articulated hauler concept.

2000 – A40D

- Engine: Volvo D12C, 420 hp
- Payload: 37 tonnes
- Load capacity: 22,5 m^3

A35D and A40D were introduced in September 2000, the result of many years of development work.

The D-series caught people's attention for a lot of reasons. The new design gives further improvement of operator safety and comfort. The D-series' haulers are built with the operator in mind. The cab is roomy and comfortable, the sound level is reduced, the air conditioning and all-round visibility are improved. Down to the last detail, the cab is built for maximal comfort, for example, the backrest on the instructor's seat can be lowered to make a table, and the cab entrance is wide and threshold-free.

It's pretty simple. A good workplace makes for a happy and effective operator who can use the machine's productivity in the best way. The D-series also meant new improved performance. For example, A35D and A40D were equipped with a new engine, D12C, new transmission components, new load and dump brake, and faster dump hydraulics. The dump body was also given a new design, which increased load capacity and made for faster dumping. An appreciated change was that the haulers in the D-series had extended service intervals, which increased productivity and lowered operating costs.

A year later, the A25 and A30 were also upgraded to the D-level according to the same concept.

AWARD-WINNING DESIGN

The success of the new D-series was no accident. Pre-studies of what was to become the D-series began already in 1992, eight years before the launch. Great emphasis was given to functional design, that the operator's comfort and safety were of great importance to the machine's productivity.

In 2001, all that work was greatly rewarded. At a trade show in the Czech republic, the A35D won the prize for best product. Also, A35D and A40D were awarded a prize by Svensk Form for "best industrial design", and a little later they were awarded a silver by the International Forum Design in the category "transportation".

Finally, both machines were awarded the prestigious German Red Dot Award for best design quality in competition with 1,500 other products.

The motivation was: "The articulated haulers A35D and A40D combine engineering precision with safety and comfort. The primary goal of the designers was to simplify heavy transports and keep the cost per ton of load as low as possible. These requirements decisively influenced the design of the two new haulers. A further consideration was to assure the safety and comfort of the operators."


A40


BM·VOLVO


VOLVO

A PERFECT PLATFORM

From the very beginning, Volvo's articulated haulers were a perfect platform for many different customized machines: they were true off-road, sturdy, effective, easy to operate and economical.

The early 860 was modified for log hauling in rough off-road conditions, and in 1976 the hook lift load shifting system was introduced, making the articulated hauler even more flexible. More new possibilities came about when the fast 5350, "The Off-road Express", was introduced in 1979.

Throughout the years, a lot of product variants and customized machines have been produced, all with the articulated hauler as platform, for example, for forestry, mines, waste handling, industrial transports, and military.

Among odd customized machines you find the hauler-type military personnel carrier and the hauler that was equipped with advanced equipment for oil prospecting. With the articulated hauler's flexibility, the only limit to its use is your imagination.

Within Volvo, the possibility of adapting the hauler chassis to tailored solutions has changed the view of what an articulated hauler is. The traditional articulated hauler with a dump body is to be regarded as a variant, even if it is the biggest.

”Volvo’s haulers have always been a step ahead”

At AB Schakt & Transport, Volvo’s haulers have ruled since the end of the 1960s. And not without reason.

– Why should we change brand? Volvo’s haulers have always been a step ahead, says site manager Björn Andersson.

AB Schakt & Transport works with road construction and, already in the early 1960s, the company used Livab’s DD1524, a Volvo tractor with a trailer. It had drive on both tractor and trailer, but the design was awkward.

When DR860 arrived in 1968, Schakt & Transport caught the new trend.

– Articulated steering and the four-wheel drive were exceptional. Manoeuvrability increased drastically. Already at that early stage we realized that the articulated hauler was here to stay, says Björn Andersson.

A number of different hauler models have been used by the company. Björn Andersson remembers them all, but some more than others.

– DR861, which replaced the DR860S, was a great model. It was perfect when it was launched. And of course, the 5350 was a major development step with its superior speed resources. A35 and A40 also meant a lot to us, we could reduce the number of haulers and increase productivity.

As a road builder, where most work is done on still roadless sites, Björn Andersson appreciates the six-wheel drive most of all.

– The six-wheel drive enabled us to go everywhere on the work site.

Throughout the years, only Volvo’s haulers have been good enough for the company. Not as a principle, they have also tried out the competition.

– But Volvo has always been a step ahead, and that’s why there’s never been any reason to change.

Today, Schakt & Transport has eight A25 and five A40 in both the C- and D-series. Björn Andersson is satisfied with them – but he also knows what he wants from the next generation haulers from Volvo.

– Today’s haulers are fantastically comfortable to operate. However, I still believe and hope that suspension will be the next step in development. During idle operation in off-road conditions, the hauler can sway a little. It affects operator comfort, which reduces machine speed and, in the end, productivity.


Schakt & Transport
VOLVO
455
Schakt & Transport

FUTURE ARTICULATED HAULERS INCREASINGLY CUSTOMIZED

This book looks back at a 40-year success story – Esbjörn Fritzell, Vice President of Hauler Loader Business Line at Volvo Construction Equipment, looks ahead. Future success is not automatic, it will only result from conscientious work.

– We have to continue to focus on understanding our customers' operations and to offer flexible solutions that suit them, says Esbjörn Fritzell.

Today, there are five basic models of articulated haulers in the D-series. Most are delivered to customers as they are.

– This will change dramatically. In the long term, I think that 50 percent of our haulers will be customized, he continues.

The solution is to divide the articulated hauler into different modules that can be adapted to the customer's needs. The traditional hauler is divided into tractor, the articulated frame, and the dump body. Other modules may be engine, drivetrain, wheels.

– And we can't get locked in to what the hauler looks like today. For example, we can replace the mechanical axles and let each wheel be driven by hydraulics or by an electric motor. We can develop an unmanned hauler or a hauler with twice as high max. speed.

The articulated hauler solutions of the future are determined by the customer's wishes and need for maximal profitability.

And that's when 40 years of innovative thinking and development make a good starting point for continued success. Something that is also embodied by the motto of this jubilee: Being the first, keeping the lead.


A40D
VOLVO
VOLVO

More care. Built in.

VOLVO

Construction Equipment

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