

Mud on the Eastern Front led Germany to commission a spectacular tug from Ferdinand Porsche, the designer of a successful World War One tractor

'Those with good memories hit on a solution...Skoda would produce the huge eight-ton vehicles to Porsche's designs'



Wheeled TRACTOR

for the Russian Front



The late autumn of 1941 threw up unpleasant surprises for the German troops massed in attack against the defending Russians. Intractable mud on the route to Moscow all but immobilised vehicles.

The situation was partially rectified by mobilising captured Russian caterpillar tractors, farm tractors and serviceable tanks, although this caused maintenance difficulties. By the spring of 1942, when the snow began to melt, it all happened again. It became clear to the Wehrmacht that it needed completely different tractors for off-road deployment than those in its inventory.

Those with good memories hit on a solution. They remembered the high-wheeled Austro Daimler M 17 'Goliath' that had been so successful in World War One. A Porsche creation, this high-wheeled tractor had drive to all four of its 57.5in wheels and 80bhp from its four-cylinder engine. They later saw civilian service and some surviving Goliaths even joined Germany's troops in World War Two.

Responding to this need, the Sixth Division of the Heereswaffenamt (Army Weapons Office or HWA) created a special commission under the direction of Ferdinand Porsche. It reviewed the work of Steyr in Austria, which was developing a tracked vehicle powered by a V-8 engine that Porsche had designed.

Officially the Steyr 1500A, this was known as the Raupenschlepper Ost, the Caterpillar Eastern Tractor. The commission also concluded that a 'new Goliath' should be fielded.

Fully briefed, Porsche chief engineer Karl Rabe began to delineate its characteristics on Monday, January 26, 1942. Entered in his log as Type 175, it was known as the Radschlepper Ost or 'Wheeled Eastern Tractor'. Manufacturing partner was Skoda of Pilsen, reawakening an important World War One relationship.

During the war Skoda had effective control of Austro Daimler, where Porsche was leading the design of the tugs and trains that Skoda built to haul its huge bunker-busting mortars and howitzers. In 1942

Skoda was subsumed into the

Wheels with less aggressive cleats were also tried on the early prototypes of the Type 175. Foot and hand-holds at the front helped mechanics access the engine



Looking factory-fresh with its shallow cleats, this was the Radschlepper Ost reporting for duty. It proudly carried the name of its maker



In towing trials the Skoda RSO was rated at five tons capacity. On hard surfaces it was notable for the noise generated by its steel wheels

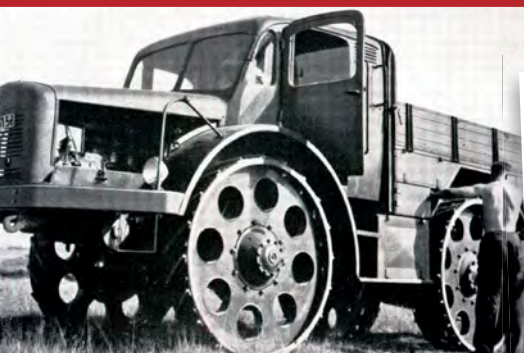
'Adolf Hitler witnessed a demonstration of the Type 175 near his East Prussian Wolf's Lair'



American troops looked over an abandoned Skoda RSO. From this angle it looked good enough to revive for duty with the Allies



Instrumentation of the prototype Skoda RSO showed oil pressure, fuel level and engine revolutions plus a totaliser



As presented for its first trials near Mladá Boleslav the Type 175 was an awesome piece of kit. Though bonnet sides were made they were not always fitted

greedy Reichswerke of Luftwaffe chief Hermann Göring.

During January, Ferdinand Porsche travelled to Pilsen to meet with Skoda's chief designer. On February 2 Porsche and Rabe hosted a day-long discussion at their works in Stuttgart-Zuffenhausen with an 11-man delegation from the Czech company. Skoda would produce the huge eight-ton vehicles to Porsche's designs, which were presented in outline. Backstopping the project was Skoda's chief Otto Hörauf, an SS man, with design leadership by Oldřich Meduna.

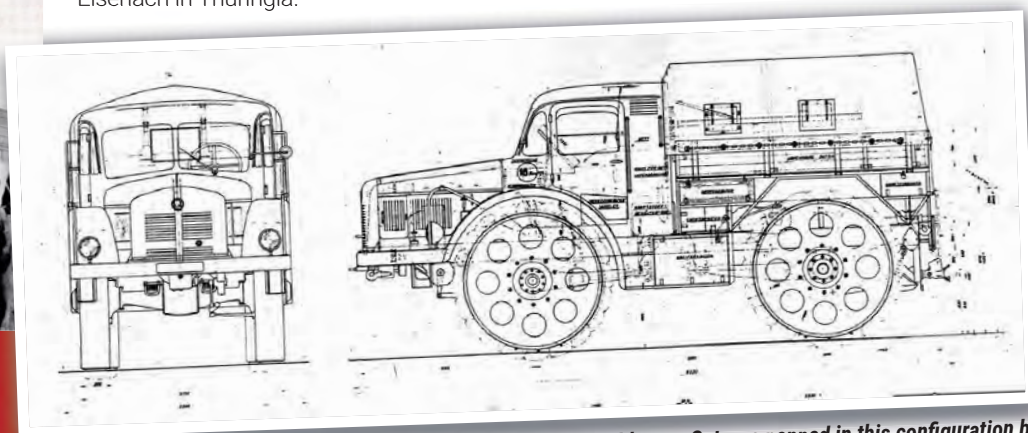
The Czech design engineers sat down in Zuffenhausen with their Porsche counterparts to define the Type 175 'RSO' in detail. Skoda designer Meduna spent two weeks a month in the Porsche design office, with several of his designers based there for half a year.

Both fluent in German, Porsche and Meduna struck up more than a working friendship, the older man revealing some of his projects to the Skoda engineer both in Zuffenhausen and later at the Berka vor dem Hainich proving grounds near Eisenach in Thuringia.

They started by adopting the same wheelbase as the Goliath, 3,000mm or 118.1in. At 59.1in in diameter the steel wheels of the Type 175 were larger than the 57.5in wheels of its World War One counterpart. Initially given eight large lightening holes, the wheels were 11.8in wide in front and 15.7in in width at the rear, while small cleats were integral with the wheels, larger ones and ice studs were stowed on board to be attached when required. The use of steel for the running surfaces was a direct response to the shortage of rubber, tyres of such size consuming far too much of this scarce resource.

Also, in short supply was lead for which the batteries in the submarines of Admiral Karl Dönitz had priority. Accordingly, Porsche and Rabe provided a small crank-started VW-based parallel-twin engine of 565cc (75 x 64mm) with 12bhp at 3,500rpm to start the main engine. The latter was a Klöckner-Humboldt-Deutz (KHD) petrol-fuelled in-line four with air cooling. Model F4L, it produced 90bhp at 2,000rpm from its 6,024cc (115 x 140mm). With pushrod-operated overhead valves, the big four was cooled by a blower driven from the nose of its crankshaft by triple vee belts.

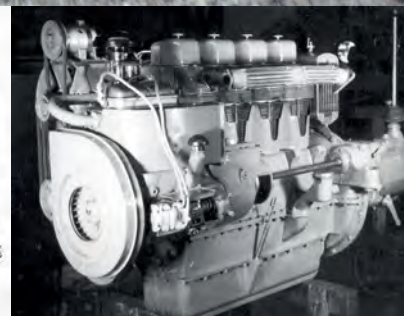
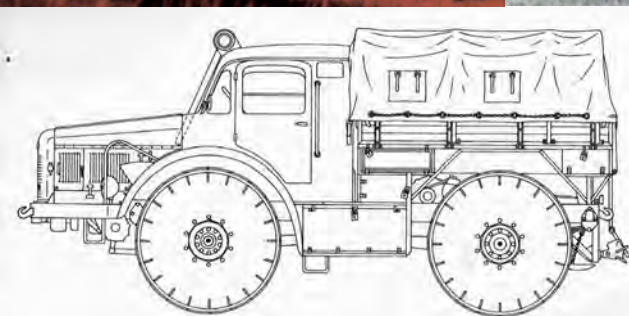
A five-speed gearbox translated the engine's torque into 11,000lbs of pulling power, delivered by a dry single-disc clutch to a five-speed transmission and then by shaft to a centrally placed transfer case. In



Its design beginning in January of 1942, the Radschlepper Ost was penned in this configuration by Porsche's chief designer Karl Rabe



ABOVE: Extra-heavy cleats for the wide wheels of the Type 175 were designed to cope with the mud on the Eastern Front that had inspired the big tug's creation
BELOW: In its final form for production the Type 175 had solid wheels, only a single handhold by the door and a mounting for the exhaust pipe and silencer above the roof



ABOVE: In the foreground of this view of the Type 175's KHD engine was its vertical-twin starting motor, derived from the VW four, with its shaft back to the geared flywheel

the final design nominal speeds through the gears were 1.5mph in first, 2.2mph in second, 3.6mph in third, 5.7mph in fourth and a top speed of 9.3mph – similar to the Goliath.

As in the Goliath, from the transfer case a separate shaft ran to a ring and pinion for each wheel, built into solid axles at front and rear. Integrated was two-stage transfer gearing with locking differentials.

Another drive ran to a winch mounted at the rear of the Skoda RSO's rugged ladder-type frame, behind the 250-litre fuel tank that ran athwart its chassis. Capacity of the winch was five tons.

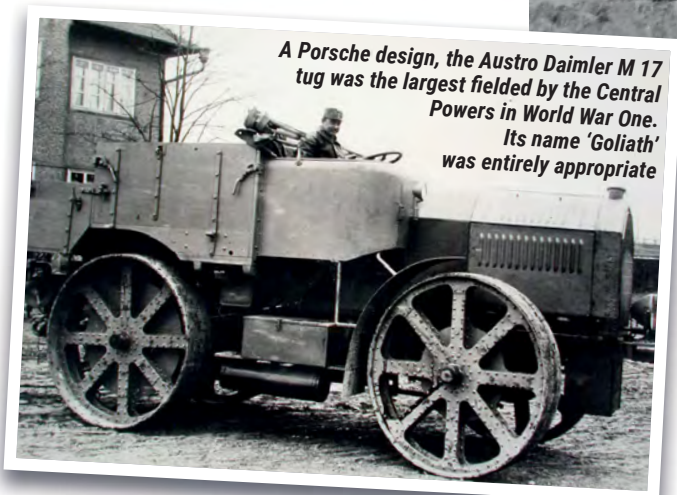
Wide semi-elliptic leaf springs carried the axles, which were guided by steel triangles pivoted from the centre of the Type 175's frame. An extra triangle braced the underside of the rear axle from the back

SPECIFICATIONS

Make	Skoda
Model	Raupenschlepper Ost
Nationality	Czech
Year	1942-1944
Production Run	196
Engine	Klöckner-Humboldt-Deutz
Type	Air-cooled in-line four Model F4L
Fuel	Petrol
Displacement	6,024cc
Power	90bhp @ 2,000rpm
Torque	N/A
Transmission	Manual with Voith coupling
Type	In unit with engine
Gears	Five
Transfer Box	Driving four axle shafts
Suspension	solid-axle, semi-elliptic leaf
Brakes	Hydraulic
Wheels	Steel, 59.1in
Tyres	None
Crew/seats	Two-six
Dimensions (overall)	
Height	120.7in
Length	244.9in
Width	90.6in
Wheelbase	118.1in
Weight	15,430lbs



BELOW: Samples of the final Type 175 were given their own trials to confirm the specification. This one was dealing effectively with simulated Russian mud



A Porsche design, the Austro Daimler M 17 tug was the largest fielded by the Central Powers in World War One. Its name 'Goliath' was entirely appropriate

of the frame. Constant-velocity universal joints allowed steering of the driven front wheels, controlled by a gear that gave six turns of the wheel from lock to lock.

The outer perimeter of the tug's turning circle was 60ft. Conventional enough in appearance, indeed

certainly adapted from an existing truck, was a wood/metal cab in which driver and attendant were seated behind a simple instrument panel and an array of levers to operate the various drives and differential locks.

Half a dozen soldiers were easily seated on a wooden loading platform covered with a canvas awning. Members of a combat crew for towed guns in the field could be accommodated in eight cots under the

canopy. Versions with a three-seat cabin and a shortened cargo platform were also produced.

On September 2, 1942 Skoda's Oldřich Meduna witnessed completion of the first two prototypes of the high-wheeled Radschlepper Ost, produced at the Skoda vehicle works in Mladá Boleslav. Their first trials were on the west side of that city's Jezera River in the Podlázky area. Porsche came to the Czech Republic for these tests of his offspring. He took the Type 175's controls several times and discussed the results of the tests in detail.

Not surprisingly these first trials threw up various issues. Porsche and Meduna were not overjoyed by the findings. The heavy and bulky RSO struggled on loose soil and its high centre of gravity was daunted by some gradients. Tests were made with and without heavy cleats on the steel wheels.

The designers decided that the faults that they identified could be made good. After necessary modifications they declared the RSO ready for its official trials. On November 20, Porsche presented the Radschlepper Ost prototypes to Albert Speer. Adolf Hitler witnessed a demonstration of the Type 175 on January 4, 1943 near his East Prussian Wolf's Lair.

Next, the big machines were tested at the HWA's official proving grounds at Berka vor dem Hainich. Members of Porsche's team and HWA representatives were on hand as were Skoda's experts. In this productive environment Skoda's Oldřich Meduna observed that neither the Wehrmacht officials nor the Porsche staff shared much of Hitler's Nazi fanaticism.

Improvements engineered into the big tractor enhanced its performance. It forded a stream almost 4ft deep and climbed a slope of 33 degrees. Among its limitations were an inability to pull a trailer of more than five tons and its large turning circle. Its height ruled it out of front-line use. In addition, driving a seven-ton tractor on rough terrain was very difficult. The wheel design was unsuited to driving on icy roads while on paved roads the wheeled RSO vibrated and radiated noise.

Tests ascertained that the Type 175 consumed 100 litres of petrol per 100km, so a tank of 250 litres lasted, at best, 230-250km. In swampy conditions under load or when towing, fuel consumption could reach an extravagant 600 litres per 100km. Although the RSO's petrol consumption was judged high, albeit not excessive for this class of vehicle, this was nevertheless a constraint when fuel was in increasingly short supply.

The trials resulted in a number of changes for production. Consisting of two steel discs in parallel, the wheels were made



The trials near Mladá Boleslav were not without their setbacks. Certain surfaces were troublesome to the Type 175, leading to changes in its gear ratios

'Not surprisingly these first trials threw up various issues'



With deep cleats the big tractor made short shrift of most of its trial challenges, here with a simulated heavy load



Shallow cleats figured in the Type 175's tests in final form, this one wearing its bonnet sides. The driver's windscreen could now be opened



Handholds next to the doors of the Skoda RSO were useful for entry and exit as Ferdinand Porsche demonstrated personally

solid after the big holes were the focus of several failures. Between the clutch and transmission, a Voith Type 384T hydraulic coupling was installed to reduce stress in the drive train. The transmission received altered gear ratios. The silencer, which had been outside the bonnet on the right, was moved to the roof of the cab.

With the showing to Hitler in January 1943, approval was granted for production of the Skoda-Porsche Radschlepper Ost. Oldřich Meduna switched his focus to the production of the RSO. This took place chiefly at Mladá Boleslav but with some components coming from Skoda's Pilsen works. Fortunately, its allocation of engines was produced by the KHD works before its Cologne plant was heavily damaged in the air raids of 3-4 June 1943.

Complicating matters was the cancellation by Mladá Boleslav works chief Alois Hrdlička of an order of 250 new machine tools specially required to build the huge tractors. Perhaps thinking already of the post-war situation, he diverted the already-approved funds to other acquisitions and projects, including cold presses to produce rapeseed oil. Thus, after Skoda's existing machine plant produced the tractors, the Wehrmacht contributed to the prosperity of Czech arable farmers after the war.

After an assessment of the roles the Type 175 could play, the HWA decided to order a series of 400 pieces. According to Skoda's surviving archival documents, after the first batch of 10 vehicles was built in 1942, in the following year 154 were produced. Finally, in 1944 another 42 tractors were built, bringing the total of the series-produced RSOs to 196.

After the curtailed production amid wartime's chaos the Skoda works found itself with 430 of the KHD engines for which they had no requirement. At the Pilsen plant there were 'quite a few' of the two-cylinder VW-based starting motors. The resourceful Czechs found uses for all these power units after the war.

As for the RSOs, most were abandoned by the Germans during their retreats and later cut into scrap. Many remaining in the eastern part of Germany were mustered for road construction until they were replaced by modern equipment in the 1960s.

In 1944 a Radschlepper Ost was found in Stuttgart and parked on the grounds of the Porsche company in Stuttgart-Zuffenhausen. Before the arrival of the Americans, someone drove it into a nearby fire reservoir. During a bombardment the reservoir's walls collapsed and buried the big machine. When in 1960 workers began to clear the ruins, they found the remains of the RSO. It was no longer suitable for restoration. ◀