FASCINATING PROJECTS

AUTOSTRADA A1 POLAND
Efficient traffic routes are an important part of a flourishing economy. The future A1 is one of the ten main traffic axes crossing Europe from the Atlantic to the Volga and from Scandinavia to the Mediterranean. When fully completed, it will link the Baltic port of Gdansk with Vienna and southern Europe via Brno in the Czech Republic and the Slovakian capital, Bratislava.

582 km of this route will be on Polish soil. Work on the first phase of construction began in late 2005. This runs from Rusocin, not far from the port city of Gdansk 90 km inland to Nowe Marzy.

Poland – good roads for a good future

Roads have been the main arteries of international trade since ancient times. We are generally familiar with the importance of the Silk Road, which ran from Turkey into eastern Asia. Its European counterpart, the Amber Road, led from St. Petersburg down the Baltic coast, through present-day Slovenia, to Venice.

Poland is a pivotal hub for transport across Europe. Thus the building of a new motorway provides lots of benefits for trade and commerce, not only for Poland but for the whole of Europe.

Excellent for Poland

The Autostrada A1 is not only important to Polish and European infrastructure; it also opens up big opportunities for people and businesses in the region and for Polish tourism:

- Good transport links promote the development of domestic enterprises
- There are direct inflows of investment due to the improved infrastructure
- The potential for rapid onward movement of goods makes the ports of Gdansk and Gdynia even more attractive
- New jobs and industrial areas will be created along the A1
- Better, faster and, above all, safer access to the Baltic coast will make Poland’s interior more attractive to tourists
- Transport planners predict an 80% drop in the accident rate compared with present traffic on the very busy national highway

The A1 links the nations from the Baltic to the Alps

Efficient traffic routes are an important part of a flourishing economy. The future A1 is one of the ten main traffic axes crossing Europe from the Atlantic to the Volga and from Scandinavia to the Mediterranean. When fully completed it will link the Baltic port of Gdansk with Vienna and southern Europe via Brno in the Czech Republic and the Slovakian capital, Bratislava.

582 km of this route will be on Polish soil. Work on the first phase of construction began in late 2005. This runs from Rusocin, not far from the port city of Gdansk 90 km inland to Nowe Marzy.

Poland – good roads for a good future

Roads have been the main arteries of international trade since ancient times. We are generally familiar with the importance of the Silk Road, which ran from Turkey into eastern Asia. Its European counterpart, the Amber Road, led from St. Petersburg down the Baltic coast, through present-day Slovenia, to Venice.

Poland is a pivotal hub for transport across Europe. Thus the building of a new motorway provides lots of benefits for trade and commerce, not only for Poland but for the whole of Europe.

Excellent for Poland

The Autostrada A1 is not only important to Polish and European infrastructure; it also opens up big opportunities for people and businesses in the region and for Polish tourism:

- Good transport links promote the development of domestic enterprises
- There are direct inflows of investment due to the improved infrastructure
- The potential for rapid onward movement of goods makes the ports of Gdansk and Gdynia even more attractive
- New jobs and industrial areas will be created along the A1
- Better, faster and, above all, safer access to the Baltic coast will make Poland’s interior more attractive to tourists
- Transport planners predict an 80% drop in the accident rate compared with present traffic on the very busy national highway

The A1 links the nations from the Baltic to the Alps

Efficient traffic routes are an important part of a flourishing economy. The future A1 is one of the ten main traffic axes crossing Europe from the Atlantic to the Volga and from Scandinavia to the Mediterranean. When fully completed, it will link the Baltic port of Gdansk with Vienna and southern Europe via Brno in the Czech Republic and the Slovakian capital, Bratislava.

582 km of this route will be on Polish soil. Work on the first phase of construction began in late 2005. This runs from Rusocin, not far from the port city of Gdansk 90 km inland to Nowe Marzy.
The project is being carried out purposefully, according to clear guidelines. A drive down this 90 km long major construction site makes it clear that everyone here knows what they are expected to do. The progress of work is extremely well coordinated and planned. A number of teams are all at work at the same time, on bridge construction, earthmoving, hydraulic engineering or road construction.

Skanska makes this happen by having well-trained personnel, regular communication and transparency. These are an integral part of the project, along with immaculate documentation. Nevertheless, unforeseen events occur that make demands on the teams’ flexibility and creativity. These range from the vagaries of the weather to archaeological discoveries and even unexploded Second World War bombs. So far, though, the Polish construction pros have found a solution to every challenge, with the result that this project, unlike many other major projects, is still well on schedule.

The Swedish-Polish joint venture, Skanska-NDI, was awarded the contract for the planning and construction of what is currently Europe’s biggest road building project.

Not only is the new link expected to meet the demands of modern trunk roads, Skanska-NDI also sets great store by cost-effectiveness. That means the contractors need to operate efficient processes using high-quality machinery and methods to ensure lasting roadway quality and enable completion of the motorway on schedule.

Construction of a motorway always means human intrusion into the natural world. In the case of the A1 appropriate steps have been taken to compensate. For instance, a number of wildlife bridges will be constructed to allow roe deer and wild boar to reach the other side of the motorway safely.

Storks are another species whose living space is affected by the construction work. These birds are very common in Poland and actually outnumber the human population in some areas. In places where individual colonies were too near the line of the new road, the nests were moved, with the greatest of care, to different locations where the storks can raise their young safely in future.

This is part of an overall approach to caring for the environment. Skanska-NDI attaches the greatest importance to environmentally compatible methods and machinery with low fuel consumption and minimal noise and exhaust emissions. Recyclable materials are used wherever possible.

A1 – an environmentally friendly project

The dynamics of efficiency

The project is being carried out purposefully, according to clear guidelines. A drive down this 90 km long major construction site makes it clear that everyone here knows what they are expected to do. The progress of work is extremely well coordinated and planned. A number of teams are all at work at the same time, on bridge construction, earthmoving, hydraulic engineering or road construction.

Skanska makes this happen by having well-trained personnel, regular communication and transparency. These are an integral part of the project, along with immaculate documentation. Nevertheless, unforeseen events occur that make demands on the teams’ flexibility and creativity. These range from the vagaries of the weather to archaeological discoveries and even unexploded Second World War bombs. So far, though, the Polish construction pros have found a solution to every challenge, with the result that this project, unlike many other major projects, is still well on schedule.

Thorough planning – the basis of success

Construction of a motorway always means human intrusion into the natural world. In the case of the A1 appropriate steps have been taken to compensate. For instance, a number of wildlife bridges will be constructed to allow roe deer and wild boar to reach the other side of the motorway safely.

Storks are another species whose living space is affected by the construction work. These birds are very common in Poland and actually outnumber the human population in some areas. In places where individual colonies were too near the line of the new road, the nests were moved, with the greatest of care, to different locations where the storks can raise their young safely in future.

This is part of an overall approach to caring for the environment. Skanska-NDI attaches the greatest importance to environmentally compatible methods and machinery with low fuel consumption and minimal noise and exhaust emissions. Recyclable materials are used wherever possible.

The dynamics of efficiency

The project is being carried out purposefully, according to clear guidelines. A drive down this 90 km long major construction site makes it clear that everyone here knows what they are expected to do. The progress of work is extremely well coordinated and planned. A number of teams are all at work at the same time, on bridge construction, earthmoving, hydraulic engineering or road construction.

Skanska makes this happen by having well-trained personnel, regular communication and transparency. These are an integral part of the project, along with immaculate documentation. Nevertheless, unforeseen events occur that make demands on the teams’ flexibility and creativity. These range from the vagaries of the weather to archaeological discoveries and even unexploded Second World War bombs. So far, though, the Polish construction pros have found a solution to every challenge, with the result that this project, unlike many other major projects, is still well on schedule.
The people working on the road construction were recruited from several different firms, and the individual teams therefore started with varying levels of knowledge and accumulated experience. Skanska-NDI provided comprehensive training to ensure that all the construction teams have the same high standard of knowledge and were fully familiar with their machines and the paving methods. Operator know-how is one of the success factors in the construction of the A1.

Because the paving and compacting are being done almost exclusively by HAMM and VÖGELE machines, the training was organised by WIRTGEN POLSKA. This covered the operation of the VÖGELE pavers and HAMM rollers, along with application technology and matters connected with asphalt paving and compacting. It was decided from the outset that the instruction would be given in Polish. This was essential in order to maximise the transfer of knowledge. The benefits of such thorough preparation soon became apparent, as Skanska-NDI is still utilising the capabilities of the HAMM rollers to the best possible effect and the rollers are thus very economical in operation.

A special service provided by HAMM further boosted productivity in the course of the project: experienced application engineers made several visits to the site from the plant in Germany. Their valuable tips on application found ready listeners and led to further process optimisation.

As well as technical data and productivity, safety also has a major part to play. Active and passive safety measures have made Skanska one of the firms with the lowest accident rates worldwide to date. HAMM rollers fit in ideally with this approach. The 3000 series compactors and the HD series tandem rollers are impressive with their large panoramic cabs that give the operators a good all-round view of the site. Other key features include the ROPS cabs and the clear symbols on the controls. The Skanska-NDI safety engineers particularly like the DV series tandem rollers, where the driver always faces forwards. Safety is built in right from the design stage.
“I selected only the best machines for this demanding project.” says Mariusz Geinewski. He should know, he’s responsible for the procurement and operation of well over 600 construction machines on this project. The obvious choice was road construction machinery from the WIRTGEN Group. The machines made by HAMM, WIRTGEN and VÖGELE not only feature the appropriate technologies for modern motorway construction but offer bonuses in terms of availability, productivity and service quality. That’s why there are a total of 99 machines from the WIRTGEN Group at work on this construction site in July 2007 – including nearly 80 HAMM rollers.

The full service provided by WIRTGEN POLSKA undoubtedly contributes to their high availability. A team of service engineers works full-time at the site yard in Rusocin. There, they deal with all the maintenance work, which is carried out at the request of Skanska-NDI strictly in accordance with the manufacturer’s instructions. They also carry out other servicing jobs, such as retrofitting chip spreaders to tandem rollers. It goes without saying that this professional team keeps a stock of the main spare parts and wear parts in store on site. If any parts needed are not on hand, prompt assistance is readily available from colleagues at WIRTGEN POLSKA in Poznan or at the plants in Germany.

Building a motorway is a highly complex project. And the complexity increases with the length, as every additional kilometre brings fresh technical challenges due to the topography or changing ground conditions. The planning, organisation and logistics during construction are correspondingly demanding. Hardly had this project got under way than the first WIRTGEN Group machines were at work, to ensure smooth progress on the seven sections, which are worked almost in parallel on the 90 km long stretch of the A1.

A solid sub base is the best base for a durable motorway. Unfortunately, the soil types occurring on this project did not always present the most desirable technical properties. The soil bearing capacity was insufficient, for example, or the soil was not readily compactable. To counter such problems, some 20,000,000 m³ of soil were replaced by the summer of 2007. This material was then stabilised in several layers, along with the remaining soil.

This was a job for strong teams: a total of 10 WIRTGEN WR 2500 S and WR 2000 model soil stabilizers mix the pre-spread cement into the soil. These are followed by HAMM compactors which compact the stabilized soil. This method improves the plasticity properties and the soil bearing capacity is immediately increased. In most cases, a 3412 HT smooth compactor works behind the soil stabilizer. Where the water content was too high, 3412 compactors with a padfoot drum were deployed.
Phase 2: the frost protection layers

Frost protection layers greatly improve the life of an asphalt road, as the draining effect prevents frost damage to the pavement. Skanska-NDI used high compaction technology from VÖGELE and compaction equipment from HAMM on many sections of the A1 to build the frost protection layer.

The crushed aggregate was put in place by SUPER 1900-2 model pavers. Compacting of the mix of basalt and granite imported from Scotland was carried out by a team of three HAMM rollers: the HD 120 equipped with vibrating drums, an HD O 90 V compacting with oscillation and a GRW 10 brings its operating weight to bear with a high static linear load.

Phase 3: paving the asphalt layers

The third phase, the paving of the asphalt layers, involved the most work for the HAMM rollers, as the 90 km of roadway were covered with four layers of asphalt: two 7.5 cm base course layers, an 8 cm thick binder layer and a 5.5 cm thick layer from stone mastic asphalt. Skanska-NDI used the rollers in groups with carefully coordinated operating weights to compact all the layers. One HD 120 tandem roller (operating weight 12 tonnes) always worked together with two to four HD O 90 V or HD O 75 V model rollers.

The number of machines used depended mainly on the roadway width. All the 7 and 9 tonne rollers were equipped with an edge cutter and presser. One of these was used to work on the edges. Meanwhile, the others took care of the rapidly increasing compaction degree and the smoothing.

In places with lots of edges to be worked and seams to be compacted, Skanska-NDI additionally made use of the advantages of the all-wheel drive DV 70 V0 tandem rollers. These machines are characterised by their tremendous manoeuvrability and the excellent view they provide of the roadway and the drum edges.

Oscillation: for extra efficiency and cost-effectiveness

The 12-tonne rollers worked in vibrating or deadweight mode on this site. All the other tandem rollers compacted by means of oscillation and vibration, working according to carefully worked out rolling patterns. This results in the best possible degree of compaction for minimum machine deployment in the shortest possible time. Efficiency pays!

It’s particularly interesting to take a look at the bridge construction, with no fewer than 86 bridge structures having to be built on the first 90 km of the A1. Most of these are viaducts or animal bridges across the motorway, but there are also five longer bridges crossing valleys. This is where oscillation rollers proved especially effective. With this type of dynamic compacting, the degree of compaction rises rapidly without running the risk of over-compaction. At the same time, though, only 15% of the vibrations caused by vibratory systems are produced. This allows oscillation rollers to compact dynamically even on vibration-sensitive structures.

Skanska-NDI was very quick to recognize the advantage of HAMM’s oscillation technology. Therefore they not only use the related machines on bridges but also for the compaction of the subbase, frost protection layers and all the other asphalt courses along the motorway. As Mariusz Gielniewski now says, “We can achieve the degree of compaction faster with oscillation rollers, with fewer passes and thus in a shorter working time.” That’s obviously a significant cost factor with four asphalt courses on a four-lane, 582 km long motorway.
HAMM AG

Hammstrasse 1
D-95643 Tirschenreuth
Tel +49 9631/ 80-0
Fax +49 9631/ 80-111
www.hamm.eu