ROGFAST TUNNEL
It will be the deepest and longest sub-sea tunnel in the world.

VOLVO CE MASTERS
Jessie Baucke won third prize in the prestigious contest.

ENGINE FOOD
We take a look at some of the alternatives fuels of tomorrow.

MADE TO FIT
Meet the customer who owns his dream machine.

SPIRIT

Volvo Construction Equipment Magazine, Winter 2020

THE BELT AND ROAD INITIATIVE:

THE MEGAPROJECT OF OUR CENTURY

The $90 billion project involves connections by road, rail and sea, running from China to the UK

CONNECTING THE WORLD

Back in the day, the old Silk Road was a marvel of modern infrastructure. With an extensive network of routes between China and Europe, it enabled the trading of goods, services and cultures on a scale that had never been seen before. In short, the world suddenly became a little more connected.

And now, the ongoing Belt and Road Initiative, also known as the New Silk Road, is having a similar impact on the world today. Camels and horses may be a less common sight, but the updated network of trails, roads and sea routes still aim to connect the world – from China, to the Middle East, through Africa and all the way to London in the UK. We believe that true megaprojects go beyond the physical infrastructure and should also serve to create socially-sustainable communities for the people that live there. Which is why we are proud to showcase Volvo CE's presence in Kazakhstan. Our machines can be seen on numerous construction sites on the route there, creating hundreds of job opportunities and in the end creating a lasting infrastructure that will improve the lives of millions. You can read their stories in these pages. I also recommend taking a closer look at the comprehensive map of the New Silk Road – the size and length is truly breathtaking.

Across the globe in Rogfast, Norway, we also see how a long commuting journey can be dramatically reduced with the construction of the world's deepest underground road tunnel. Currently, commuters struggle with a daily trek across numerous fjords that can take up to 21 hours. But by keeping traffic underground, their journeys will become much more manageable – all the while preserving the beautiful Norwegian landscape.

If there's one thing these impressive projects show us, it is that connecting our world has never been more important – especially at a time of escalating conflicts and political uncertainty. But while better roads and shorter journey times are vital to keep the lifeblood of our economies going, it is more heartening to see how construction can contribute to building a better world for the people that live and work there. If Volvo CE can play a small part in this, then it will be a worthy contribution.

Enjoy your reading!

Tiffany Cheng
Director, External Communications
Volvo Construction Equipment

SPIRIT

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Winter 2020

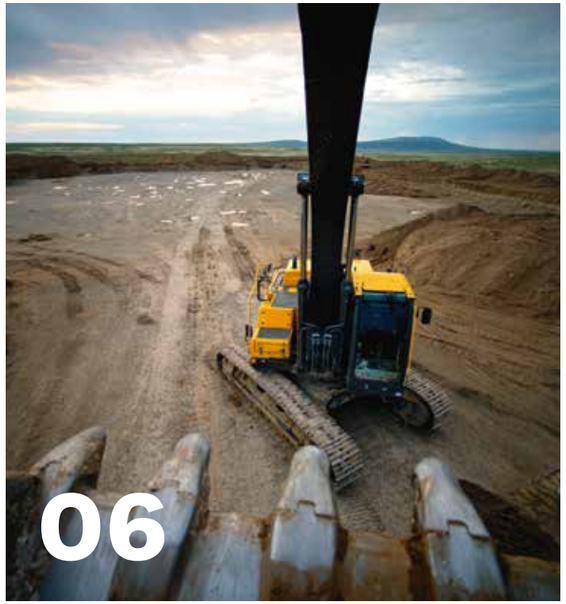


Photo by **Shutterstock**

Sometimes it is good to look back at history to find inspiration for the future. With the New Silk Road, China is changing the world of logistic. Just as the ancient Silk Road once brought goods and ideas between the East and the West, new routes over land and by sea are again connecting Asia with Europe and beyond.

THE MEGAPROJECT OF OUR CENTURY HAS STARTED

By **Carl Undéhn & Anna Werner**
Photos by **Andrey Kulagin**

Old curvy roads along the original Silk Road between China and India, in Sikkim. This is now part of the New Silk Road, connecting China with Asia and Europe.

It has been called "the biggest project of the century" and goes by several different names. It used to be called One Belt One Road. Today the official name is changed to the Belt and Road Initiative, in short BRI. In daily use, however, it is called by perhaps its most beautiful name: The New Silk Road. It is a reference to the ancient merchant route known as the Silk Road which emerged about 2,000 years ago, as the demand for Chinese silk increased in the West. From the former Chinese capital Xian, merchants travelled through central Asia, passing by legendary towns such as Samarkand, on their way to the markets in the cities of Middle East and Southern Europe. Besides bringing goods between the East and the West, the trade on the Silk Road also stimulated the exchange of ideas, science and culture.

In a speech in 2013, Chinese president Xi Jinping officially launched the vision of a New Silk Road. According to Xi, the project is the beginning of a "new era of globalization" which will drastically increase the connectivity between Asia, Europe, Africa – and even further beyond. Panama is also participating in the initiative and there are initiatives to include more parts of Latin America and the Caribbean.

Construction projects in more than 60 countries are planned or already taking place and China has closed 173 deals with more than 120 countries as well as 29 international organizations. As more and more countries are participating, the project continues to grow, and the total extent of the New Silk Road is still to be seen. But when finished in 2049, the 100th anniversary of the People's Republic of China, this ambitious megaproject will span across at least three continents and involve over half of the world's population.

The new trade routes are expected to be a game changer for global logistic flows – and the effects are already being noticed.

Since January 2019 goods are being transported by train on the new rail Silk Road between China and Europe. The trains are rolling at an average speed of 80 km/h through the endless steppes of central Asia, passing through newly built towns along the way. In some cases, these new towns have been developed so quickly that they still cannot be found on most printed maps. Yet, they are inhabited by thousands of people. And soon it might be as many as 100,000, as in the case with the new city Nurkent which is being developed around Khorgos on the Chinese-Kazakhstan border. Here, close to the Eurasian "Pole of Inaccessibility", which means as far away as you possible can get from any ocean and hence literally in the middle of nowhere, lies the largest dry-port in the world.

Khorgos Gateway is one of the main logistical key-points on the New Silk Road where the total number of handled containers per year is expected to surpass 500,000 already 2020.

Photo by **Shutterstock**

"It is an extremely long construction site, more than 700 kilometers and we have more than 1,000 machines working on it. This is the largest project of my career so far."

YANG BO, PROJECT MANAGER AT CITIC GROUP

01 Khorgos Gateway, the largest dry-port in the world. Right now, the new city of Nurkent is being built around it.
02 When finished, the new road in Kazakhstan will be over 600 km long.

Not too far from Khorgos lies the sleepy town of Usharal. Life is about to change dramatically here too. Today the town is connected to the next city via a road that has been neglected for decades. Now, a new highway is constructed that will be finalized in four years. The Chinese construction company CITIC Group is responsible for the re-construction, which is part of the Belt and Road initiative.

"It is an extremely long construction site, more than 700 kilometers and we have more than 1,000 machines working on it. This is the largest project of my career so far," says Project Manager Yang Bo at CITIC Group.

He has more than 60 Volvo excavators working along the construction site and Bo is very pleased with their performance.

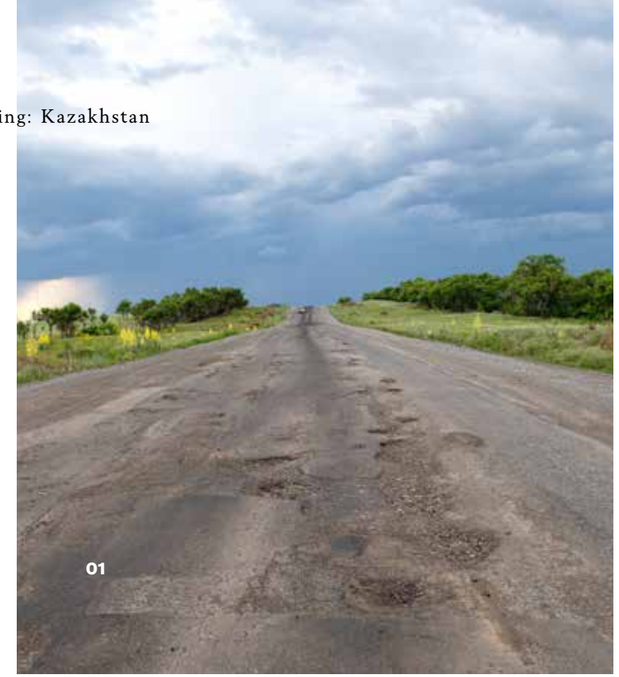
"Volvo machines are not cheap to purchase. But they are high quality machines and we can already tell our investment will pay off in the long run," he says.

The scale of the Usharal-Taldykorgan project requires a large workforce. Yang Bo has 2,000 operators working for him. Among them are 1,500 local Kazakhs, while 500 are Chinese employees.

"It is complex to work in a cross-cultural environment. Chinese and Kazakh culture differs, for example in how we pay attention to time.

Yang Bo, Project Manager at CITIC Group

CITIC Group has more than 60 Volvo machines working on site in Kazakhstan.



01

But we have worked out our difficulties and today operations work very smoothly. One needs to respect each other and communicate to bridge the gaps," says Yang Bo.

He feels strong pride in the re-construction of the road from Usharal and the fact that it will improve life for the people living in the city.

"They will have a safe road that connects them better to the rest of the area. This will bring work to Usharal," he says.

Yang Bo feels strongly about the project from a personal point of view too.

"My grandparents worked in the former Soviet Union and they told me about it while I grew up. I feel they are sending me a message every time I see a camel. Camels were the first means of transportation here back then," says Yang Bo.

Nevertheless, the New Silk Road is not only bringing change on the steppe of Central Asia. In Duisburg, Germany, another logistical key point of the route has emerged. On the area of a former steelwork at the junction of the rivers Ruhr and Rhine, the world's largest inland port has been created – and with that thousands of well needed jobs in the region. Around 30 trains per week arrive from China at Duisburg where they are reloaded for further transport to London, Madrid or the port of Rotterdam. The number of "China trains" are higher each year and play a large role in the increased rail freight at the port. The trains from China could bring much more freight if the travel time is shortened even further. The "problem" lies in Europe where the trains need about seven days from Poland to Duisburg. But the European tracks can be used more efficiently and the total travel time from southern China to Duisburg is possible in as little as eight days. That is almost the same time needed as when shipping by air – but to a much lower cost.

Taking it all into consideration – the speed, the cost and the efficiency – makes it obvious that the resurrection of the Silk Road will have a huge impact on the world logistic in the decades to come.

CONSTRUCTING THE NEW SILK ROAD

Watch the film from Kazakhstan
www.volvoce.com/spirit

"Volvo machines are not cheap to purchase. But they are high quality machines and we can already tell our investment will pay off in the long run."

YANG BO, PROJECT MANAGER AT CITIC GROUP

02

03

01 The old road in the area was in a really bad state.
02 The construction site on the vast steppe stretches as far as the eye can see.
03 In the future, the children of Usharal will be able to travel on improved roads.

This is how the world will change with the New Silk Road

By **Carl Undéhn**

Parag Khanna is a global strategy advisor and author of several books about globalization. He has studied how people connect around infrastructure. We asked him how the world will look like once the Belt and Road Initiative is finalized.

Parag Khanna has studied the Belt and Road Initiative (BRI) closely. He describes the BRI as the "largest coordinated infrastructure investment campaign in human history". During travels in Eastern and Central Asia he has witnessed how the BRI is changing not only the world of logistic but also the living conditions along its route.

The BRI is said to reshape the geography of Asia, if not the whole world. What impact will it have on logistics and trade?

The BRI will accelerate the process that began in 1991 with the collapse of the Soviet Union of customs agreements and enhanced infrastructure enabling more efficient flows of goods and services across borders both within Asia and globally. We are seeing Asian logistics companies merge and form joint ventures at a rapid pace, further enabling market integration.

Besides trade and logistic, are there other benefits or effects because of the large investment in infrastructure?

Absolutely, the flows of commerce are much more than just trade. We are also seeing visa regulations lifted so that billions of people have greater ease of mobility. This too contributes trillions of dollars to economic growth with tourists, business travelers, students and so forth cross borders in Asia.

When it comes to the construction of infrastructure, what do you think are the most important parts?

All categories of infrastructure are important, whether hard aspects like roads, railways, pipelines, and internet cables, or soft dimensions such as schools, hospitals, and so forth.

In what way will the world be different once BRI is completed?

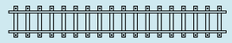
We are already seeing a shift towards the greater Indian Ocean region of "Afro Eurasia" spanning Europe, Africa and Asia become the center of the world economy and trade. That process will be complete with the full extension of BRI projects across these regions.

Photo by **Arenda Ooman**

Parag Khanna, global strategy advisor

THE NEW TRAVEL ROUTES OF THE WORLD

China is in the midst of re-drawing the map of the world. The Belt and Road initiative, also known as the New Silk Road, is a global trade strategy based on the ancient Silk Road trading route. The infrastructure program concerns not just one but a number of routes connecting China with the world, both over land and by sea. Volvo CE is working on several sites within the initiative, Kazakhstan being one of them.



12,000 KM
The length of the train route connecting China and the UK.

OVER USD 90 BILLION
China's direct investment in the project from 2013 to 2018.

9

The number of countries the train tracks pass through (China, Kazakhstan, Russia, Belarus, Poland, Germany, Belgium, France and the UK).

18

The number of days it takes to travel by train from China to the UK.

3,000
The number of residents in Nurkent, a town built completely from scratch in Kazakhstan used to house the people constructing the new rail hub.

404

The number of Volvo machines sold for projects along the New Silk Road.

66

The number of countries, including China, which are directly involved in infra-structure projects within the Belt and Road Initiative.

24

The number of projects constructing the New Silk Road that Volvo CE is involved in.

CONSTRUCTING THE NEW SILK ROAD

Excavator operator Gaziz Dusekenov in Kazakhstan has four children. His oldest son is an operator, while his second son is training to become one. Will the other two become operators as well? Only time can tell.

By **Anna Werner** Photos by **Andrey Kulagin**

"I am proud to work on a project that will improve life for so many people. I actually think of that now when I stand here, that life at this beautiful place will be better in the future."

GAZIZ DUSEKENOV, EXCAVATOR OPERATOR

It is a sunny morning on the steppe in Kazakhstan. Operator Gaziz Dusekenov has just made the short ride from the camp where he is sleeping to the construction site up the hill. He has more than 30 years of experience working as an excavator operator, but today is his first day on a new job at CITIC Group.

"My family lives in Almaty and I had a job there. But that firm got financial problems so I started to look for another job. I am very excited I got the opportunity to work on this project," he says.

Here at the construction site up the hill, the view is amazing. Green hills surround the vast open steppe. The new road, which Gaziz will be working on, is winding through the landscape like an ocher-colored snake. The road is one of many projects within China's majestic undertaking to create a New Silk Road. The project will connect the East to the West in new ways and the segment which Gaziz is working on will mean a great improvement for the people living along the route. Today the ride between Kazakhstan's largest city, Almaty, and the small town of Usharal is a time-consuming and daunting experience.

"I am proud to work on a project that will improve life for so many people. I actually think of that now when I stand here, that life at this beautiful place will be better in the future," Gaziz says with one of his many happy smiles.

01 Work with a view. Gaziz Dusekenov sits comfortably in the cab.
02 Gaziz has 30 years of experience as an operator.

He has always liked machines. He started to work as an operator three decades ago while he still was living in the village where he grew up. He has operated many excavators and talks with great enthusiasm about what it is like to sit in the cab of the Volvo excavator he is operating today.

"Everything works so well. One can tell that it has been designed to really serve as a working place. The levers are exactly in the right place. It is comfortable and human, if you see what I mean?" says Gaziz.

His enthusiasm over his career has clearly had an impact on his four children. His oldest son is working as an operator, while his second son is training to become one. And what about his third and fourth child?

"My third child is a school girl. We will see which career she chooses when that time comes. My youngest son is still a small child," Gaziz concludes and starts up the excavator for today's work.

6

GAME-CHANGING CONSTRUCTION PROJECTS

The history of the world is full of remarkable construction projects. However, just some of them have been true game-changers in building and sustaining our greatest civilizations – provided advantage in warfare, boosted economies and brought wealth to people. This is a list of six bold construction projects that pushed the boundaries of their time and made significant impact on a world scale.

By **Karin Andersson**

Sources: Russia Beyond, History.com, Waterhistory.org, NASA, Wikipedia.

01

Photo by **Shutterstock**

Photo by **Shutterstock**

01 / THE IRRIGATION SYSTEMS OF THE NILE

The river Nile and its predictability has brought prosperity to the civilization of Egypt for 5,000 years. The complex irrigation systems have helped the Egyptians to make a better use of the water from the river, with the first evidence of water control from as early as 3,100 BC. The Egyptians took advantage of the natural cyclical flooding pattern of the Nile: because this flooding happened fairly predictably, they were able to develop their agricultural practices around it.

The irrigation systems have lasted through warfare and conquest and the agricultural foundation has remained intact throughout history – proving the ancient Egyptians right when building their system around the river's natural pattern instead of trying to transform it. No other place on Earth has been in continuous cultivation for so long.

02 / ROMAN ROADS

The Roman roads are perhaps the Roman Empire's greatest legacy, crucial for its massive expansion and a way to keep control over the gigantic empire. The road system covered large parts of today's Europe, Turkey and the northern parts of Africa. Construction began in 300 BC and the roads served several purposes. They facilitated fast movement of the armies and trade goods, as well as civilians. But they also served as a way to mark the borders of the Roman Empire, to claim new territories and maintain them.

The quality of the roads was unsurpassed at its time. They were durable, easy to navigate and enabled high speed of transports. The whole system comprised more than 400,000 kilometers of roads at the peak of the Roman Empire. No fewer than 29 great military highways radiated from the capital, later giving birth to the saying "All roads lead to Rome."

Photo by **Shutterstock**

Photo by **Shutterstock**

04 / INTERSTATE HIGHWAY SYSTEM

It was the American president Dwight D. Eisenhower who had the idea of constructing federally funded interstate highways, while traveling across the country by car – a trip that took over a month. He not only wanted the United States to be ready to respond to military conflict, but also to improve shipping and transportation across the entire country. Construction began in 1956 by building new roads and converting old routes into interstates. The final planned piece of the system was finished in 1992 with I-70 through Colorado.

Possibly the most valuable improvement to the country's infrastructure and definitely one of the costliest projects in the entire world. The total length of the entire system of roadways is 77,556 kilometers – roughly enough to wrap the Earth, twice.

03 / SUEZ CANAL

The Suez Canal in Egypt is a waterway that connects the Mediterranean Sea to the Red Sea and is one of the world's most heavily used shipping lanes. It was constructed between 1859 and 1869 and provides the shortest maritime route between Europe and the lands lying around the Indian and western Pacific oceans. The 193-kilometer-long route is therefore a direct link between Eastern and Western civilizations, shortening the distance from Europe to Asia by more than 8,000 kilometers.

Apart from boosting Egypt's economy, the canal is crucial in international trade routes – also because of its easy passage with no need of locks. In recent year, improvements have been made to expand and widen the canal for easier navigation and to allow more volume and higher frequency of the largest container ships.

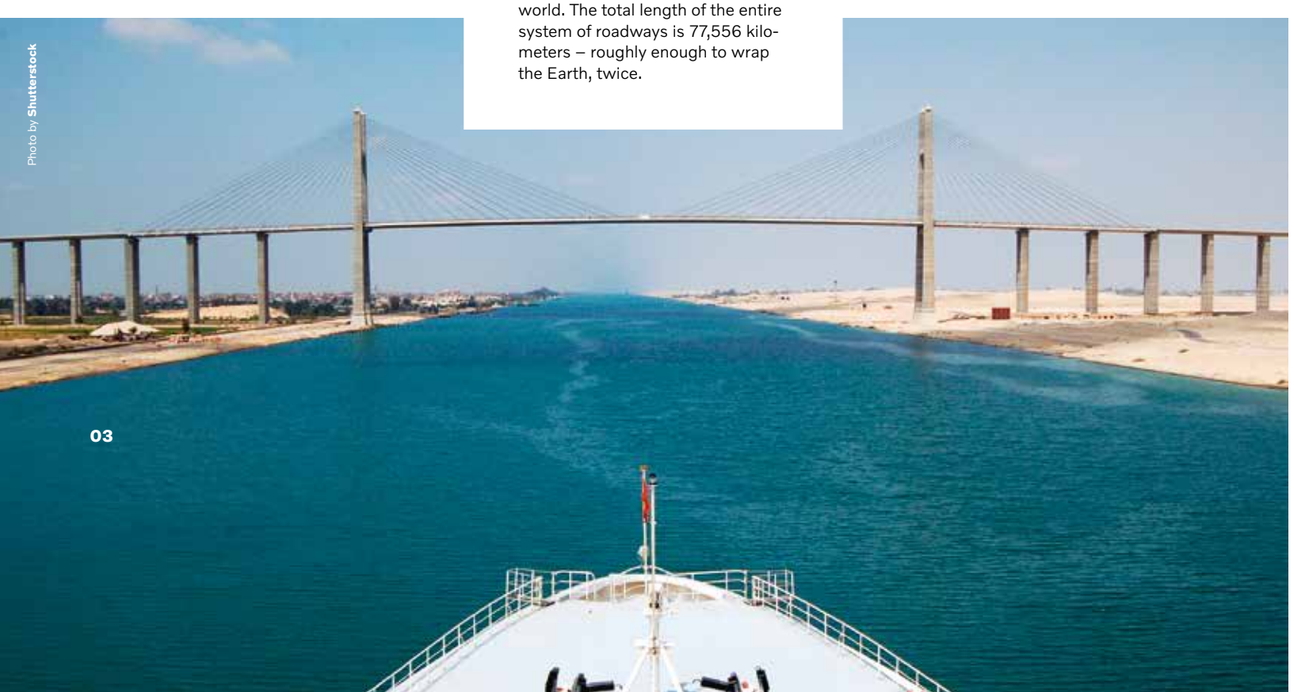


Photo by **Shutterstock**

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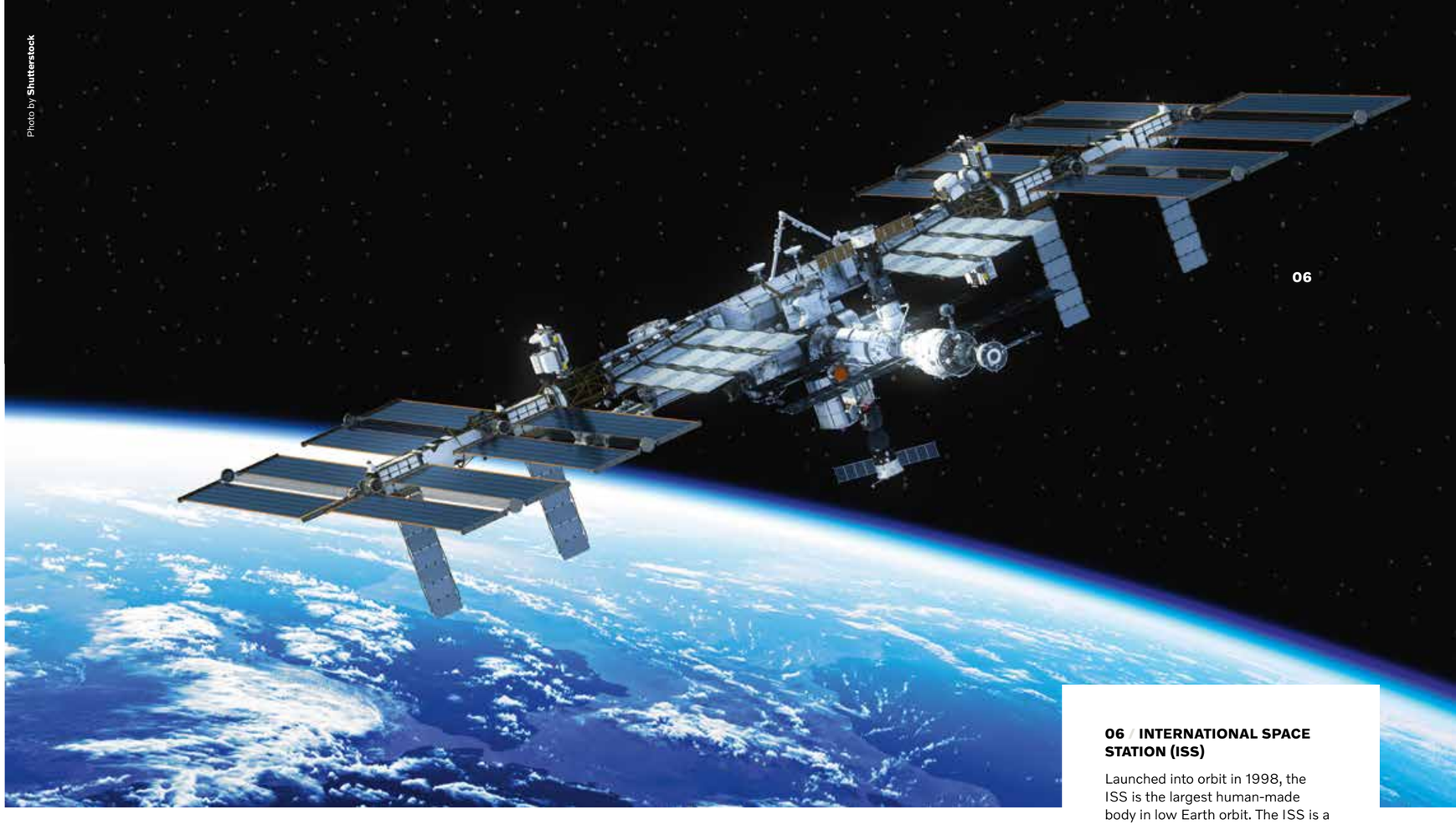


Photo by **Shutterstock**

06

06 / INTERNATIONAL SPACE STATION (ISS)

Launched into orbit in 1998, the ISS is the largest human-made body in low Earth orbit. The ISS is a unique science laboratory and also serves as a home or astronauts and cosmonauts – making it possible for people to have an ongoing presence in space since the beginning of the century. The crew members conduct experiments in areas such as biology, physics, astronomy and meteorology, enhancing life on the planet and preparing for further space exploration.

But apart from the great scientific importance, the ISS is also a human achievement. As a joint project between space agencies all over the world – former rivals in the space race – the construction and developing of the ISS shows that a cooperating group of nations can accomplish one of the world's most technically ambitious large-scale engineering project ever. Literally pushing the boundaries of the Earth.

Photo by **Shutterstock**

05 / TRANS-SIBERIAN RAILWAY

Stretching from Moscow to Vladivostok, the Trans-Siberian Railway has connected the world's largest nation for more than 100 years. Before the construction of the railway began in 1891, there was no steady connection between European Russia and the Asian areas – making the country vulnerable to threats from foreign powers. But the railway became more than just a way to strengthen Russia's military position.

The completion of the railroad marked the turning point in the history of Siberia opening up vast areas to exploitation, settlement and industrialization. The Trans-Siberian line remains the most important transport link within Russia, as around 30% of Russian exports travel on the route.

TEEN IN CONSTRUCTION

He faces challenges common to every equipment owner or operator: winning bids, hitting deadlines and dodging weather. Adding to his headaches, are the hassles of finding a ride to the job site and someone to haul his excavators. Meet Lance Matheson, a 14-year-old construction company owner.

Text & photos by **Amy Crouse**

As baby boomers retire and skilled trades struggle to come back from the recession of the late 2000s, Lance is setting an example for his peers of how rewarding it can be to get into the construction industry.

"A lot of people my age use their free time to play video games or stuff like that, and I use that time to develop a skill that I can use for the rest of my life," says Lance, owner of Sage Demolition and Land Clearing in Layton, Utah, just off the eastern shore of the Great Salt Lake.

01

Lance grew up around equipment thanks to his dad Dwayne Matheson's construction and landscape recycling company, Evergreen Soils.

At age 13, he earned his state-issued general contractor's license (B-100) and engineering/demolition license (E-100). He incorporated Sage Demolition & Site Clearing, with assistance from his sister, Aubrey, who is an accountant, while sister, Amy, chipped in for marketing support.

The venture has become a full-fledged business that has impressed many in the local construction industry – and beyond – earning him larger jobs. For example, Lance was subcontracted by Target Demolition on a multi-million dollar Salt Lake project.

Besides winning large jobs, Lance and his father keep safety and training in the forefront as well.

"He figures things out pretty easily but at the same time, the experience that I have is necessary to keep things in line," says Dwayne. "Some jobs I let him do completely on his own. Some jobs I'll drop him off and pick him up several hours later. Other jobs I'm right there with him the entire way.

Lance's work ethic and passion for the industry are unique for a 14-year-old, and more up-and-comers like him are desperately needed.

"Skilled operators of heavy construction equipment, it's a dying art," says Dean Garrett, co-owner and president of Morgan Pavement, who hired Lance to demolish several structures on his property. He says: "What parents and school teachers should be teaching the youth today is to go out and get trained. A four-year college degree or a post-graduate degree is not the answer to everything. They're good and we need those degrees out there as well, but we need skills training. I would encourage them to look into the trades. The trades are going to pay well in the future."

02

"A lot of people my age use their free time to play video games or stuff like that, and I use that time to develop a skill that I can use for the rest of my life."

LANCE MATHESON, SAGE DEMOLITION AND LAND CLEARING

03

01 A 14-year old with a rather unusual title: Company owner.
02 Lance Matheson with Dee Knight, one of his mentors.
03 Like father like son. Dwayne Matheson is also in the construction business.

As for equipment, Lance himself credits for much of his success and growth, too.

"My dad had an old L90C wheel loader that is the first piece of Volvo equipment I ever ran," says Lance. "I recently traded my 210C excavator in for a 220E and I really like this machine because it's fuel efficient. It's fast. It's precise and it's reliable. Now we have three Volvo exavators and six Volvo loaders."

Thanks to the reputation he's built, Lance has a very clear vision for what's to come.

"In 10 years, I would like to have a well-established demolition business, have enough employees and be able to run two crews," he says. "With those two crews, I would like probably two 220 excavators and maybe two 220Es, and then mini and demolition excavators, dumps with the higher capacity stuff, and then a roll-on truck for the smaller stuff. Then maybe a loader to clean stuff up and that's pretty much it."

THE FUELS OF OUR FUTURE

The diesel engine is an indispensable part at construction sites all around the world. But the engines don't necessarily need to run on diesel. With the use of alternative fuels emission can be vastly reduced – or fully eliminated with electrification.

By **Carl Undéhn**

In recent years, biofuels have become overshadowed by the ongoing shift to electrification.

But when used with engines such as Volvo's latest Stage V compliant range, biofuels have the advantage of reduced emissions already today. Yet, despite the diversity of biofuels – or because of it – fossil diesel remains the fuel of choice.

"It's a big challenge for manufacturers to build and guarantee an engine's performance with all the biofuels available," says Robert Ericson, Chief Engineer for heavy duty platforms at Volvo CE.

> "It's a big challenge for manufacturers to build and guarantee an engine's performance with all the biofuels available."
>
> ROBERT ERICSON

Still, Volvo performed tests with trucks running on biofuels more than a decade ago.

And since the 1990s, diesel has been blended with biodiesel, or "Fatty Acid Methyl Esters". They include a range of synthetic fuels made from vegetable oils, with rapeseed methyl ester (RME) being the most common. With some adjustments, it is even possible to use 100% RME in a diesel engine. But more often, RME is added to diesel in various amounts.

"If these biofuels are blended into diesel at their recommend limits, generally no modification of the engine is necessary," says Stephanie Searle who is in charge of the Fuels program at the International Council on Clean Transportation (ICCT).

The independent, non-profit organization provides research and analysis for environmental regulators to improve the efficiency of transport – for instance by the use of biofuels.

Where RME is regarded as the first generation of biodiesel, its successor hydrotreated vegetable oil (HVO) is a more complex product with better performance characteristics.

"HVO is the best of these fuels in terms of compatibility with existing vehicles. It is chemically similar to diesel and can be used in high rates without any modification," says Stephanie Searle.

Volvo CE vehicles are certified to use 100% HVO which, depending on the manufacturing process, can reduce the CO_2 emissions up to 90%.

"The climate impacts depend mostly on the feedstocks used. HVO produced from waste oils and animal fats generally have a better climate performance than using virgin vegetable oils," Stephanie Searle explains.

Less commercially used, but nevertheless promising, is dimethyl ether (DME). The clean burning gas emits very low emissions of NOx and Volvo Trucks have done field-testing with engines modified for DME. But being a gas it needs special injection systems.

The biggest change in the near future is the replacement of diesel engines for batteries.

"When it comes to lowering CO_2 we can't ignore the impact of electric, and we are actively developing this technology," says Toni Hagelberg, Director of engine systems at Volvo CE.

With improved storage capacity, batteries might be able to fully replace even larger combustible engines.

Already next year, Volvo CE launches electric compact excavators and compact wheel loaders ranges. The L25 Electric compact wheel loader and the ECR25 Electric compact excavator will both offer eight hours of emission-free runtime as well as greatly reduced noise pollution.

Photo by **Shutterstock**

3 ALTERNATIVE FUELS IN SHORT

HVO

HVO stands for hydrotreated vegetable oils. It is very similar to conventional fossil diesel and can be produced from a range of different bio-oils, such as pine oil, palm oil, animal fats or waste vegetable oils.

Photo by **Shutterstock**

DME

DME stands for Dimethyl Ether and is s a clean-burning and non-toxic alternative fuel that can be produced from biomass or fossil sources, such as natural gas. DME is a gas at atmospheric pressure but is liquefied at a low pressure, 5 bar.

RME AND FAME

FAME stands for Fatty Acid Methyl Esters, and is manufactured mainly as RME, that in turn stands for Rapeseed Oil Methyl Esters. It is based on rapeseed, and trans-esterified with methanol to attain a higher cetane number and reduce viscosity. It is a biodegradable, and renewable, bio-mass based fuel.

Photo by **Shutterstock**

Source: ICCT

Photo by **Øyvind Ellingsen**

RE-CONSTRUCTING THE NORWEGIAN WEST COAST

Route E39 in Norway winds through spectacular coastal landscape. But with seven ferry crossings, it is a time-consuming drive. Now, Norway embarks on the country's biggest infrastructure project in modern history. A pioneering tunnel and bridge construction will cut travel time by half.

By **Görrel Espelund** Photos by **Tove K. Breistein**

The sun is shining on the cold, glittery water of Boknafjorden. Two ferries, one in each direction, are just about to leave the shore. On the surface, all is serene, but a revolution has begun underground. A drilling-rig manifests itself like a giant spider in a tunnel 150 meters below sea level. Saltwater is dripping from the ceiling and one can smell the scent of ammonium in the air. The scent lingers since the latest detonation. Another section of the new tunnel is about to be carved out. The torch lamp on Arne Oddvar Haugeland's helmet throws some light on the walls. He is a foreman operator and has worked in tunnels his whole career, 42 years.

Arne Oddvar Haugeland

"What can I say, I have always enjoyed it. To drive the machines down here, I am proud of that skill," he smiles.

Meter by meter Haugeland and his team are excavating what will become the world's longest and deepest sub-sea road tunnel. It will be a twin-tube 27 kilometers long tunnel that crosses two fjords and at its deepest will be 392 meters below sea level. Being a spectacular construction in itself, the Rogfast link is just one part of a bigger scheme, The Coastal Highway Route E39 Project.

The project will re-shape the Norwegian West Coast and is the biggest infrastructure project in the country's history.

"It is an enormous national investment plan and it's very exciting to be part of it," says Frank Grønvold, Project Manager for the tunnel project at the contractor NCC, one of the leading construction businesses in the Nordic countries.

The Coastal Highway Route E39 runs between Kristiansand in the south and Trondheim in the north. The road passes through six counties and through the cities of Stavanger, Bergen, Ålesund and Molde. About a third of Norway's 5.3 million people live along the West Coast. Route E39 is an important artery for Norwegian businesses, as some 60 percent of the country's export goods are produced on the West Coast.

"It's an enormous national investment plan and it's very exciting to be part of it."

FRANK GRØNVOLD, PROJECT MANAGER NCC

02

When E39 leaves Norway it proceeds to Denmark, making it an important entry point to the European continent. The route is beautiful, winding through the spectacular coastal landscape. But the stunning fjords have also made the route a painfully time-consuming ride, with seven ferry crossings. All in all, the route takes 21 hours to drive.

Today, that is about to change. Apart from replacing ferries with tunnels and bridges, several sections of the road across the country will be upgraded. The improvements will cut the current travel time in half and the route, which measures 1100 kilometers, will be 50 kilometers shorter. A preliminary price tag is set at approximately 340 billion Norwegian kroner (the equivalent of 39 billion US dollars), according to Norwegian Public Roads Administration.

For Håvard Langåker, truckdriver at Vassbakk & Stol, the E39 is his workplace. He looks forward to the transformation.

"I spend quite some time queuing for the ferries. A lot of time can be saved in the future when I will be able to just drive under the fjords," he says.

Håvard Langåker

His standard route is between Bergen and Stavanger and today he drives a load of excavated rock from the Rogfast tunnel construction at Boknafjorden.

01

Apart from tunnels and bridges, other spectacular constructions are in the pipeline for the improved the E39. The Norwegian Public Roads Administration is considering a completely new construction: the world's first submerged floating tube bridge (SFTB).

"The SFTB could be applicable for some of the deepest and longest fjords where suspension bridges or floating bridges would be difficult to build," explains Kjersti Kvalheim Dunham, Project Manager at the Norwegian Public Roads Administration.

However, at the moment the engineering and testing of the SFTB is under development.

"With construction well underway, we expect that 10 percent of the Coastal Highway Route E39 project will be completed this year. More than one third of the project will be completed by 2030, and the finances for our current projects are already in the National Transportation Plan," concludes Kvalheim Dunham.

Håvard Langåker is on the road again and Arne Oddvar Haugeland and his team continue drilling in Boknafjorden. For Haugeland, the Rogfast tunnel will be his last project.

"Tunnel work is basically the same as when I started, even if the machines and the explosives have improved greatly. What I will truly miss is the camaraderie within the team," he says.

"I spend quite some time queuing for the ferries. A lot of time can be saved in the future when I will be able to just drive under the fjords."

HÅVARD LANGÅKER, TRUCKDRIVER

04

03

01 Fjord view. With the new tunnel, the nice views will be preserved.
02 Busy ferry traffic. The waiting in line for the crossover will soon be over.
03 Ready for the cab.
04 The tunnel is being carved out meter by meter.

DRIVING UNDER THE FJORDS

Watch the film from Norway
www.volvoce.com/spirit

THE CHALLENGE OF WORKING UNDERGROUND

Blast, load and dump. The pre-work of constructing a tunnel may sound like a simple, mechanic job, but it holds challenges that you do not see at first glance. Blasting foreman Arne Oddvar Haugeland is a pro and has been in the industry for nearly half a century. Every day, he faces the risks of working sub-sea. Then it is important to be able to trust your colleagues.

By **Kerstin Magnusson** Photos by **Tove K. Breistein**

Deep underground, the work environment is dark, and requires good lightning.

Inch by inch, the machines move forward, dig deeper and are slowly forming what is to become the Rogfast tunnel. When finalized, it will be the longest and deepest sub-sea road tunnel in the world – 392 meters below sea-level and 27 kilometers long. On site, the contractor NCC is building two supporting tunnels, each 2 kilometers long. They will serve as ventilation shafts once the main tunnel is ready. Down here, it is dark, but surprisingly warm.

Foreman operator Arne Oddvar Haugeland has just transported a load of ointment from a blast. He disembarks the Volvo articulated hauler and closes the door to the cab.

He conducts and also performs the detonations on site in the Rogfast project and has worked shifts under water for a while now. You can tell that he both enjoys and masters the tasks at hand.

"What can I say, I have always loved machines. I had a Harley motorbike back home that I loved to work on too. And working on a tunnel project is exciting and challenging. Take the dark for example. We work with head torches and lamps, but one should remember that these are the only light sources we have, so it is still challenging," he says.

When constructing a tunnel, there is always a large portion of explosives involved. In turn, you always risk slides on site.

"Safety is key. I'm on a team with two other guys on our shifts, and it is important that we trust and look after each other."

And working together for hours in darkness and in a quite challenging environment, brings even more, according to Arne.

"You become really tight. It is camaraderie. It's a very important part of this job, to get along and to know what to do when you are down there. In the end, it's a special feeling when you realize that you master the machine and the environment."

Arne is soon ready for retirement and Rogfast will be one of his last projects. When he started out, back in 1974, a lot was different on the sites.

"It has definitely changed to the better when it comes to safety and work environment. The machines are also so much better. The job is easier now than it was then."

Moving closer to retirement, there is one thing he really will miss.

"The companionship, for sure. But I look forward to just relaxing as well. My plan is to buy an apartment in Spain and perhaps move there."

Sunny Spain will be a big contrast to the obscure sub-sea environment in Rogfast. Arne agrees and laughs, before turning the light on his head torch back on again, preparing for another blast.

FOUR SHORT ONES WITH ARNE

In the lunchbox: Nistepakke, a packed lunch with sandwiches. I put salty sausages or cheese and pepper on.

Favorite machine: The Volvo A30. This model has great comfort.

Listens to in the machine cab: Nothing. I know many others do, but there are so many other noises around, and I want to be able to concentrate.

Best construction job so far: I was in the Dominican Republic for two years with a project. Great people, great place. I saw Shakira in concert there, and afterwards I named my German shepherd Shakira.

"Safety is key. I'm on a team with two other guys on our shifts, and it is important that we trust and look after each other."

ARNE ODDVAR HAUGELAND, FOREMAN OPERATOR

01

01 Arne in the cab. He has always loved machines.
02 Good friends. The collegaues mean the world.

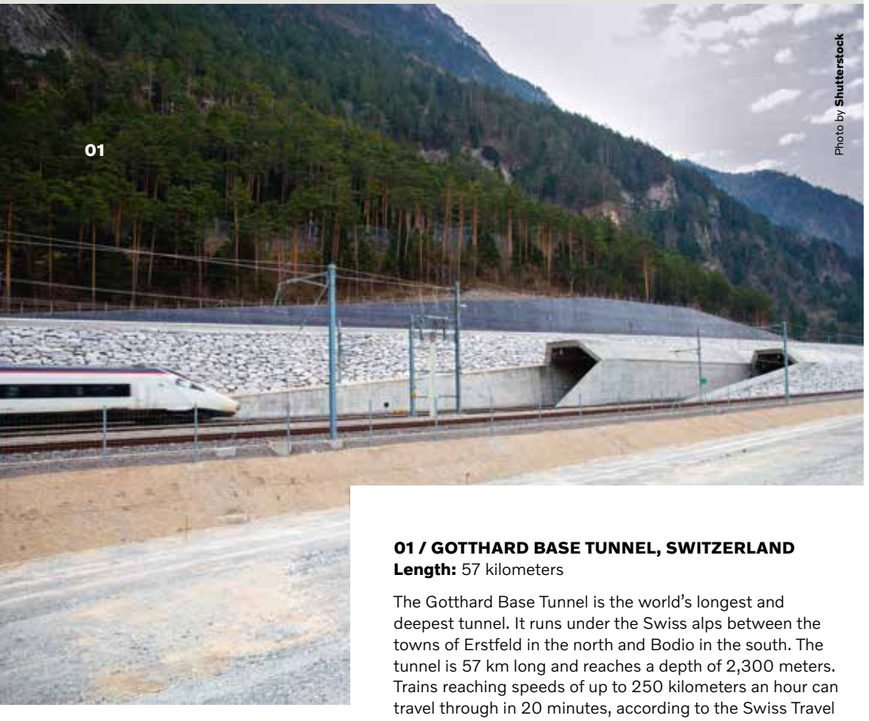
02

NINE OF THE WORLD'S MOST SPECTACULAR TUNNELS

One was dug by hand in China, another reshaped the geography of Europe and a third doubles as a drainpipe. Welcome to the fascinating world of tunnels.

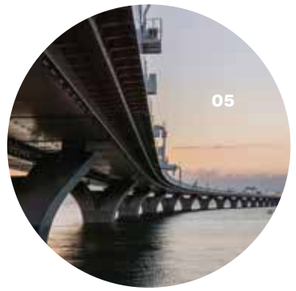
By **Anna Werner**

Sources: CNN Travel, Wikipedia



01 / GOTTHARD BASE TUNNEL, SWITZERLAND
Length: 57 kilometers

The Gotthard Base Tunnel is the world's longest and deepest tunnel. It runs under the Swiss alps between the towns of Erstfeld in the north and Bodio in the south. The tunnel is 57 km long and reaches a depth of 2,300 meters. Trains reaching speeds of up to 250 kilometers an hour can travel through in 20 minutes, according to the Swiss Travel System. The tunnel has helped to decrease the travel time between Zurich, Switzerland, and Milan, Italy, by an hour.



02 / SEIKAN TUNNEL, JAPAN
Length: 53 kilometers

The Seikan is a railway tunnel in Japan. What makes it unique is the fact that a 23-kilometer stretch of the tunnel is 140 meters below sea level. Until the Gotthard Base Tunnel was built, it was the longest and deepest rail tunnel in the world. The Seikan tunnel spans the Tsugaru Strait, connecting Aomori Prefecture on the island of Honshu to the island of Hokkaido. Work on the tunnel started in 1964 and was completed in 1988.

03 / CHANNEL TUNNEL, UNITED KINGDOM AND FRANCE
Length: 50 kilometers

The Channel Tunnel is not only one, but three tunnels. Two of them are meant for railways and the third is for service and security purposes. The tunnel runs between Folkestone in England and Pas-de-Calais in northern France and is used for both freight and passenger traffic. The 50-kilometer-long tunnel is largely considered to have defined the term megaproject. It changed the geography of Europe and helped reinforce high speed rail as an alternative to short-haul flights.

04 / LAERDAL TUNNEL, NORWAY
Length: 24.5 kilometers

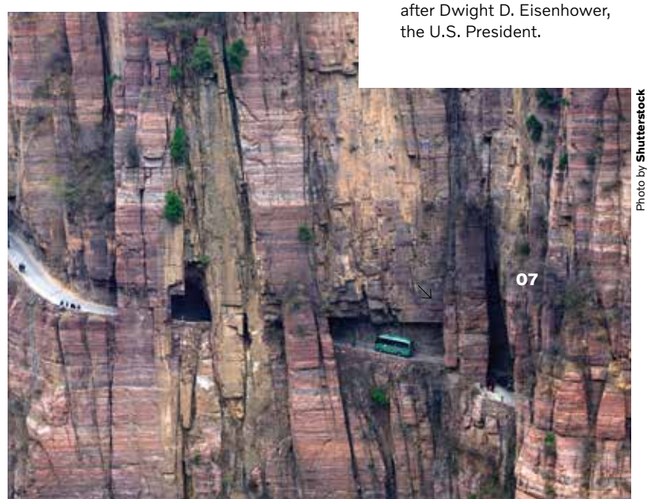
The tunnel is located in North Norway and is 24.5 kilometers long, making it the world's longest road tunnel. To drive through takes 20 minutes. The sheer length of the tunnel led to studies in driver psychology which was used to evolve the design of the tunnel. The studies resulted in a design where lit caverns every 6 kilometers creates variation and alleviates claustrophobia and tiredness.

05 / TOKYO BAY AQUA-LINE, JAPAN
Length: 14 kilometers

It is easy to mistake this tunnel for a bridge because part of the structure comprises a 4.4-kilometer span as well as a 9.6 kilometer sub-sea conduit. The Aqua Line crosses Tokyo Bay and connects the cities of Kawasaki and Kisarazu. It reduced the journey time between the two from 90 to 15 minutes. The tunnel is considered the precedent for constructing two-lane road tunnels.

06 / EISENHOWER TUNNEL, USA
Length: 2.72 kilometers

The Eisenhower Road Tunnel in Colorado is one of the world's highest tunnels, located 3,401 meters above sea level. The tunnel is the longest mountain tunnel and constitutes the highest point on the Interstate Highway System. The tunnel carries Interstate 70 (I-70) under the Continental Divide in the Rocky Mountains and opened in 1973. The westbound bore is named after Dwight D. Eisenhower, the U.S. President.



07 / GUOLIANG TUNNEL, CHINA
Length: 1.2 kilometers

Before the construction of this impressive tunnel, the only way to access the village of Guoliang was via a narrow path carved into the side of the Taihang Mountains. In 1972, a group of 13 villagers decided to construct a tunnel, which they dug by hand. Three villagers died during the construction, but the tunnel transformed the village and became a tourist attraction in its own right.

08 / SPIRALEN TUNNEL, NORWAY
Length: 1.65 kilometers

The Spiralen road tunnel, built in 1961 and comprising six spirals covering 1,649 meters leads to one of the most spectacular viewpoints in the industrial town of Drammen. The tunnel opens out to a dramatic view of Drammen Valley.

09 / SMART, MALAYSIA
Length: 9.7 kilometers

The tunnel, the longest in Malaysia, was built to solve the problem of flash flooding in Kuala Lumpur. SMART is an acronym for Stormwater Management and Road Tunnel. SMART can operate in three ways:

1. When there is no flooding, it serves purely as a road tunnel.
2. When there are floods, rainwater can be diverted into a lower channel, and the upper level will remain open to traffic.
3. When exceptionally heavy floods occur, the tunnel closes to all traffic and watertight gates open to allow floodwater to flow through.

“YOU ALWAYS NEED TO BE 110 PERCENT SAFE”

A tunnel under water – how can that be done? With more than 40 years of experience of constructing tunnels, Knut Storli, Foreman at contractor NCC, is one of Norway’s tunnel experts. Here are the challenges of building tunnels under the sea.

By **Görrel Espelund** Photo by **Tove K. Breistein**

History holds several examples of tunnel constructions under water. The first, The Thames Tunnel in London, was inaugurated in 1843 and considered a civil engineering success. Since then, Norway has picked up the mantle as the world’s foremost tunnel builders. The country holds examples of several spectacular tunnel constructions. One of them being the Laerdal Tunnel, the world’s longest road tunnel. Now, Norway is planning the world’s longest and deepest underwater road tunnel.

Knut Storli, Foreman at NCC, is one of the experts working on the first phase of the tunnel.

How do you start with a project such as an underwater tunnel?

“When constructing a megaproject such as Rogfast, you need to take it in several steps. The first thing you do when starting a project is a thorough geological and seismological investigation of the area to get a proper picture of the rock mechanics you are going to work in. Then, we will start by constructing two parallel cross-cut tunnels that will be used for transport of excavated materials during the construction of the two main tubes. When Rogfast opens, the cross-cut tunnels will be used as ventilation shafts.”

How do you tackle the challenges of building a tunnel under water?

“To make sure we don’t run into any water or softer layer of rock that is difficult to work through, we drill probe holes with the tunnel rig, normally 24 to 27 meters in front of the tunnel. If we discover any leakage, we seal the tunnel by drilling several holes around the tunnel profile and pump a water cement mix with high pressure into the rock cracks. Another challenge is the risk of salt water that can seep through and cause damage to the equipment.

From an environmental point of view, there are very strict rules for what we can dump back into the sea. The water and mud from the drill and blast construction must be decontaminated and cleared of any oil remnants or other impurities. Once the construction is complete, ventilation is a major issue. The cross-cut tunnels we are building will be used for this purpose. In case of a fire, controlling the air currents in the tunnel are of vital importance to the rescue work.”

What kind of equipment is needed?

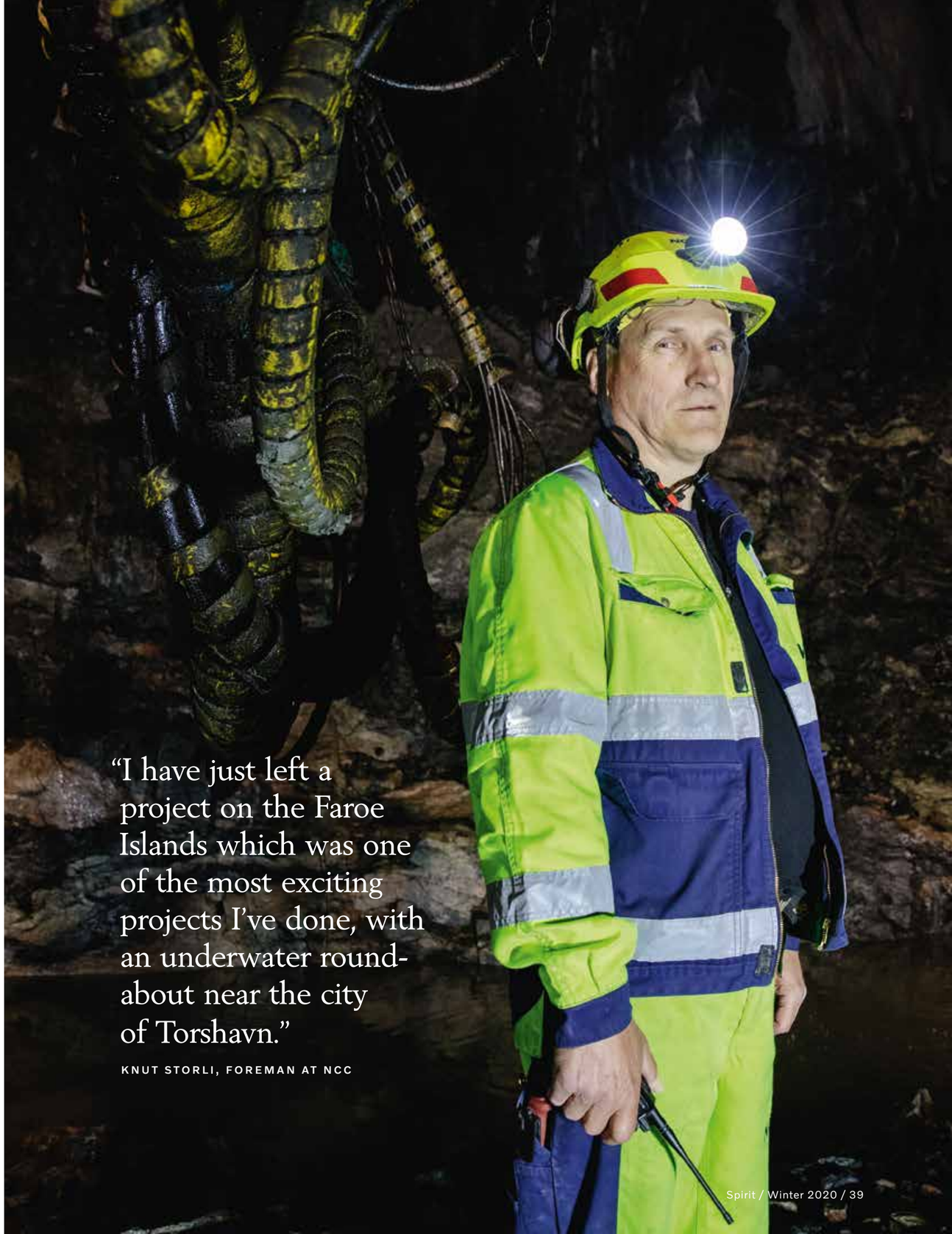
“We use a mix of Norwegian and Swedish tunnel rigs. We also use wheel loaders, articulated haulers and trucks that move the blasted rocks out of the tunnel.”

Why are Norwegians so good at building tunnels?

“We’ve been doing this for a very long time, so we have highly developed competence and techniques. Also, we have a lot of experience in building underwater tunnels for hydro power. I have just left a project on the Faroe Islands which was one of the most exciting projects I’ve done, with an underwater roundabout near the city of Torshavn.”

What makes the Rogfast tunnel special?

“It will be the deepest and longest underwater tunnel in the world. But constructing it will need the same equipment and the same expertise as for any other underwater tunnel. You always need to be 110 percent safe when working on such a project.”



“I have just left a project on the Faroe Islands which was one of the most exciting projects I’ve done, with an underwater roundabout near the city of Torshavn.”

KNUT STORLI, FOREMAN AT NCC

HE MASTERS HIS OWN DESTINY

Kandhula Venkatesh went from being a day laborer to a skilled senior operator – but the road was long and winding. It all started with a three-month operator course provided by Volvo Construction Equipment in India and the GMR Varalakshmi Foundation (GMRVF).

By **Kerstin Magnusson**

The story begins in the Nirmal District in Telangana, India. Kandhula Venkatesh was born and raised in the village of Perakapall. He married at the age of 21 and then quickly needed a way to support his family of eight members. The option at hand with only little education was a job as a daily laborer at construction sites. Not satisfied with the job, he tried to find another occupation in Mumbai, but again had to settle with a day-to-day job as a construction laborer. He soon returned to Perakapall, disappointed.

Not to give up, Kandhula kept exploring more options that would go with his minimal education. Through some friends he came to know about GMRVF in Hyderabad and their training programs. He was admitted at the Excavator Operator course, which is offered in partnership with Volvo. After completion, Kandhula has had several jobs within the construction industry, for example in Iraq.

"I am a completely changed man now. I have transformed my life and my destiny from being a daily laborer to a highly paid professional."

KANDHULA VENKATESH

"I am a completely changed man now. I have transformed my life and my destiny from being a daily laborer to a highly paid professional," tells Kandhula Venkatesh.

The Excavator Operator course started in 2012, when Volvo CE India and GMRVF decided to join forces to help underprivileged youth in India and take them from poverty to being employable in the construction equipment industry.

"It is a three-month course that provides basic operational and technical information about Volvo excavators, including operations, maintenance, best practices, operational safety, cabin control and application training," explains Vijay Simhans, Competence Development Manager at Volvo CE India.

The training is delivered through theory classes, hands-on training on excavators and one week of training on sophisticated excavator simulators at the Volvo Training Centre in Bangalore.

"Most of the trainees have progressed very well in their careers with quickly progressing to being the main operator. There has been continuously high demand for the course and the initiative is helping the industry as well as the trainees. They get the chance to face another life than the one that perhaps seemed pre-destined for them," says Ramesh Choppara, Deputy Program Coordinator at GMR Group.

The Excavator Operator's program is one of two projects continuously running in India. The second one is the Operator Training Program. It is conducted by Volvo CE India in collaboration with dealer partners all over the country. The program consists of a 2–3 day workshop held by a Volvo CE Operator, who trains existing operators in the industry.

"The objective is to help the participants to understand design concepts, maintenance, and, very important, machine safety and personal safety around the machines. We have done the training in several rounds and it is always very popular. It is very rewarding to be part of something that contributes to improved safety," says Surat Mehta, Head of Marketing, Retail & Competence Development at Volvo CE India.

As for Kandhula Venkatesh, the opportunities after the training in the Excavator Program have been several. For example, he has built his own home. Moreover, he is already thinking of the next step in his professional life: "I am planning to purchase my own excavator. Then I can fully become a master of my own destiny."

01 Photo by **Bikshapathi**

Photo by **Bikshapathi**

02

The Excavator Operator Program Started in 2012. Till date more than 700 candidates have been trained in close to 45 batches conducted across the two centres with almost 100 % placement for all pass-out candidates.

The Operator Training Program Started in 1997. Recognized by the Indian government and the industry. After training, the participants receive a certificate on behalf of IESC. More than 1,000 operators were trained in 2018.

Photo by **Kairi Satyam**

03

01 After classes, there is always room for some play.
02 The Excavator Operator Progam consists of three months of intense education.
03 Kandhula Venkatesh is now a proud excavator operator.

Photo by **Lars Bruch**

Jessie Baucke with her team mates in “Tech Blacks” , that won third prize in the latest edition of Volvo CE Masters.

A TECH MASTER

Teamwork, knowledge and stamina. All are put to the test in the Volvo CE Masters. 26-year-old Jessie Baucke, a Parts Manager from New Zealand, can now proudly call herself a prize winner in the construction industry’s toughest challenge. Doing so, she is also following in her father’s footsteps.

By **Kerstin Magnusson & Daisy Jestico**

Back in the days, Jessie Baucke’s father, also working in the industry, participated in Volvo CE Masters with great success. Like Jessie’s team, who won third prize, he also made it to the finals.

“It was actually my father who gave me the tip about a vacancy where I work now, TransDiesel, a Volvo CE independent dealer. He had worked with Volvo machines for years and that made me familiar with the machines to some extent,” tells Jessie.

She has been with TransDiesel for four years now and teamed up with two other guys at work for the Masters’. Here, skilled mechanics and parts experts on Volvo machines compete in solving different problems. The rounds are held in different parts of the world.

“We call ourselves Tech Blacks. It has been great to be able to test my knowledge against the best in the industry in these series of challenges. That and the fact that we got to travel the world and meet people from different countries has been the best part,” she says.

01

Photo by **Alexandra Rudenäs**

> "Not only does the contest identify the best of the best, but it also boosts the reputation of hard-working dealers everywhere and shows just how much skill is needed to deliver a world-class service to our customers."
>
> **HANS-JUERGEN SALAU, GLOBAL MANAGER TECHNICAL TRAINING AT VOLVO CE**

To perform well under pressure require skills – but also practice. The Tech Blacks prepared well before the finals in Eskilstuna, Sweden.

"Besides the day to day working environment, we all flew down to Christchurch, New Zealand, for a two day training course. There, we caught up and went over some of the new features we hadn't seen yet."

Nevertheless, Jessie reveals that there were some extra tricky parts in the actual competition, where she and the team were put to the test a little bit more:

"An extra challenge was working on Volvo pavers, and Volvo E-series excavators with dig assist. I had never seen a paver before. Everything was completely new to me. We don't bring these into New Zealand."

The Volvo CE Masters are divided in different rounds, starting at the dealer level in each country and then leading up to the regional and global final. It all happens during the course of almost three years. It was launched as a novel way to showcase the talents of the many parts and services technicians working across Volvo CE's dedicated dealer network. When it began in 1990 individual participants were pitted against each other and tasked with completing a series of machine tests. Fast forward almost 30 years and the contest – now judged in teams – has grown into the industry's biggest and most challenging technician battleground.

Hans-Juergen Salau, Global Manager Technical Training at Volvo CE, who organizes the competition together with Jan Fogelberg, Manager Technical Training, says:

"Not only does the contest identify the best of the best, but it also boosts the reputation of hard-working dealers everywhere and shows just how much skill is needed to deliver a world-class service to our customers."

02

Photo by **David Akpone**

01 Full concentration. In the Masters, problems are also partly solved via digital tools.
02 Happy campers. At the prize ceremony in Eskilstuna, Sweden.

Photo by **Volvo CE**

VOLVO CE MASTERS / BASIC FACTS

The Volvo CE Masters competition is arranged by the global and regional aftermarket training organizations. It is open to technicians of authorized Volvo CE dealers with a clear focus on know-how and practical knowledge. The aim is to help employees develop and improve their knowledge, skills and ability to work as a team. The competition is also a way of showing how much hard work that is carried out at dealers all over the world, and that we together invest in what our customers appreciate most – world class service.

VOLVO CE MASTERS 2017–2019

This edition had over 3000 applicants, and in the end they were boiled down to one winning team of three persons. The teams were judged on various performance metrics. Their technical and parts systems knowledge and skills were evaluated, alongside their judgement around the proper handling of tools, and demonstrations of Volvo's brand values. Jessie's Baucke and her Tech Blacks came in third place.

VOLVO CE MASTERS – THE PROCESS

01 / Registration opens
Everyone who wants can register online.

02 / Individual online test
A test to try individual skills. Afterwards, the teams can be formed to represent the dealership in the competition's second round.

03 / Team online test
The teams will face theoretical questions regarding products, parts and service according to Volvo protocols and standards.

04 / HUB competition
The competition takes a leap across international borders, where the best dealer teams at the hubs compete against each other.

05 / Regional finals
Based on the outcome, the best teams are drafted to the Regional Finals where they go head to head with the winning HUB dealers.

06 / Global finals
The finalist teams from each of the APAC, AMERICAS, EMEA and CHINA regions are flown to Eskilstuna, Sweden, for the final leg of the competition.

CREATING PURPOSE-BUILT VOLVO MACHINES

A more powerful machine with a capacity to go through really thick walls. The specification in demolition expert Wesley Princen's head was clear. The result? The Volvo EC750E HR – made by customers' demands. "It is really a dream come true. Finally, I can work with this + 100 tons machine that we have named 'The Beast'. It is a jewel," he says.

By **Kerstin Magnusson**

Imagine knowing exactly what you want, but then realizing that you can't make it come true by yourself. About two years ago this was the situation for Wesley Princen, a demolition expert in Belgium. He is considered among the best in the world at high-voltage demolition and has recently even moved into nuclear demolition. This new kind of job calls for a strong excavator that can work well with large tools through thick walls.

Wesley Princen was the first Belgian customer who owned the Volvo EC480HR D-series. Now, he opened a dialogue with Volvo CE representatives in order to create something new.

"In the demolition segment, collaboration with customers is key. They know the application the best and are facing the danger and challenges in demolition work every day. We have had a dialogue with Wesley throughout, although the team also gathered input from major demolition contractors around the world," says Peter Lam, Volvo CE's Demolition and Solutions Specialist in Europe, the Middle East and Africa.

Wesley Princen communicated the needs that he had identified: a stronger excavator suitable for industrial demolition, for example at power stations. He didn't specifically need a very high reach like most demolition customers ask for. On the contrary, a shorter one would enable him to use stronger and heavier tools, cutting through thick concrete walls and steel bars at power stations.

"In the special application solution team at Volvo CE, we work hard to take in feedback from customers and create something that meets ALL their needs. In demolition, safety and transportability are also of immense importance. Those kinds of machines need to be safe and easy to transport from site to site," says Peter Lam.

"In the demolition segment, collaboration with customers is key. They know the application the best and are facing the danger and challenges in demolition work every day.

WESLEY PRINCEN, AANEMINGSBEDRIJF PRINCEN

"The Beast" in all its glory on site in Schelle, Belgium.

Photo by **Peter Lam**

Volvo EC750E HR

Maximum allowable tool weight* with 36m 3-piece demolition high reach equipment:
3,600 kg / 7937 lbs

Maximum allowable tool weight* with 26m 3-piece demolition high reach equipment:
5,000 kg / 11,023 lbs

Operating weight: 103,028 kg
Max. pin height: 36 meters
Max. pin reach: 22,273 milimeters
Engine gross power: 393 kW

*Working 360 degrees

Wesley Princen's top 4 favorite things about the EC750E HR:

Stability
"I don't have to worry about the undercarriage. This results in higher productivity and less stress as an operator."

Transportability
"We can easily transport it in three parts, boom, counterweight and base machine."

Comfort
"Sitting in the cab is like sitting at home in the living room."

Esthetics
"Last but not least! Everyone seeing the machine loves the sight."

Photo by **Oliver Halls**

Wesley Princen from the demolition company Aannemingsbedrijf Princen in Belgium.

After months of work and feedback from the involved customers, a final version of the EC750E HR was ready to be launched at the end of 2018. Other customer feedback asked for a very high reach, and that was created as well. Princen started to use it on a project in April 2019.

"The first job I did was at a powerplant in Liège, Belgium. We did this with the 26 m HR boom attached and a 5 tons concrete shear. We tested the 750 to the maximum and even with the 5 tons shear we could get a reach of the pin of 21,4 m. That means an awesome stability and an incredible reach. The second job, where the EC750E HR is still working, is a powerplant in Antwerp, Belgium. There, we have to demolish a high voltage substation plus the cooling water inlet and channel. In this phase, we are using the digging boom equipped with an 8 tons hammer and a ripper bucket. For this job, 'The Beast' is showing its incredible stability and power ripping out giant foundation blocks."

"I am dreaming about doing something with an EC950E or an HR or a tool carrier with high oil cooling capacity and high flow possibilities. That way, you can easily work all day long with hydraulic tools."

WESLEY PRINCEN, DEMOLITION EXPERT

As for the future, Peter Lam and the Volvo special application solution team are constantly listening to more feedback from customers and they plan to continuously grow the number of purpose-built excavators.

"This is an on-going work. And we are lucky to have the experts right in front of us – they become like a family. The close contact we have with them is key," he concludes.

And Wesley Princen is looking forward to more collaborations with Volvo:

"I am dreaming about doing something with an EC950E or an HR or a tool carrier with high oil cooling capacity and high flow possibilities. That way, you can easily work all day long with hydraulic tools."

THE VOLVO CE NEWS

FIRST CUSTOMER TRIAL FOR THE ECR25 ELECTRIC

French contractor Spac, part of the Colas Group, has received the first ECR25 Electric, in the customer trial phase. Spac is using, since August 2019, the 2.5-tonne excavator to dig trenches at a golf course just outside Paris, France.

"For residents and cities in general, it makes our worksites more acceptable because it limits carbon emissions and noise disturbance," says Benjamin Silvent, site manager for Spac.

The Volvo ECR25 Electric replaces a combustion engine with 48-volt lithium-ion batteries and an electric motor that powers the hydraulics to move the machine and attachments. The batteries store enough energy to power the machine for 8 hours in typical applications, such as utility work. An onboard charger enables overnight charging via a regular household plug socket. A fast charging option, requiring more powerful grid access, will also be available.

This machine will be available in selected countries later on this year.

SAVE THE DATE FOR CONEXPO

North America's largest construction trade show, ConExpo will be held March 10–14 in Las Vegas, U.S., with over 2,800 equipment manufacturers exhibiting in over 2.8 million square feet of space.

Volvo CE is planning an ambitious ConExpo customer experience that will stretch over 3,345m² (36,000 ft²) on the outdoor Festival Grounds, booth F3432. Over 30 machines and related uptime and productivity services will be on display, including several making global and regional debuts. Volvo's electromobility evolution will be center stage, and in keeping with the Building Tomorrow theme, watch for a motivating new announcement at the show.

Demonstrating the scope of the Volvo Group, Volvo CE will be joined in the ConExpo booth by Volvo Penta and Volvo Trucks as well as our other equipment brands, Terex Trucks and SDLG.

Register on ConExpo's website.

1 MILLION CONNECTED CUSTOMER ASSETS AT VOLVO GROUP

In October, the Volvo Group passed a true milestone; reaching one million customer assets in terms of delivered trucks, buses and construction equipment. The large amount of data collected is now used to improve productivity by increasing vehicle and machine uptime, reduce emissions and noise and also to improve traffic and site safety.

Signifying the passing of this milestone, Volvo CE handed over four excavators – each complete with Volvo's built in telematics system CareTrack – to Danish rental company GSV Materieludlejning in Kirke Hyllinge, Denmark.

A GROWING CONNECTIVITY ECOSYSTEM

Nowadays advanced machine control systems can help improve the quality and reduce the time it takes to conduct construction site activities. There is a range of components installed in our machine in order to making machine control a reality – here we list the top ones.

01 / SENSORS

An inertial measurement unit (IMU) is an electronic device that measures and reports the specific force, angular rate, and sometimes the orientation of the thing it is attached to – for example, a bucket, boom and arm of an excavator.

02 / IN-CAB TOUCHSCREENS

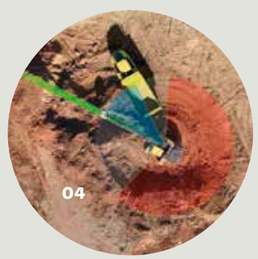
Simple and intuitive, touchscreen tablet computers allow operators to set up projects in just a few touches. The Volvo Co-Pilot for example, is a state-of-the-art touchscreen tablet that powers all Volvo Assist applications.

03 /GLOBAL NAVIGATION SATELLITE (GNSS) ANTENNA AND GNSS RECEIVERS

This refers to a constellation of satellites that together provide signals from space that transmit positioning and timing data to GNSS receivers. The receivers then use this data to determine location. GNSS and Global Positioning Systems (GPS) work together, but the main difference between GPS and GNSS is that GNSS-compatible equipment can use navigational satellites from other networks beyond the GPS system.

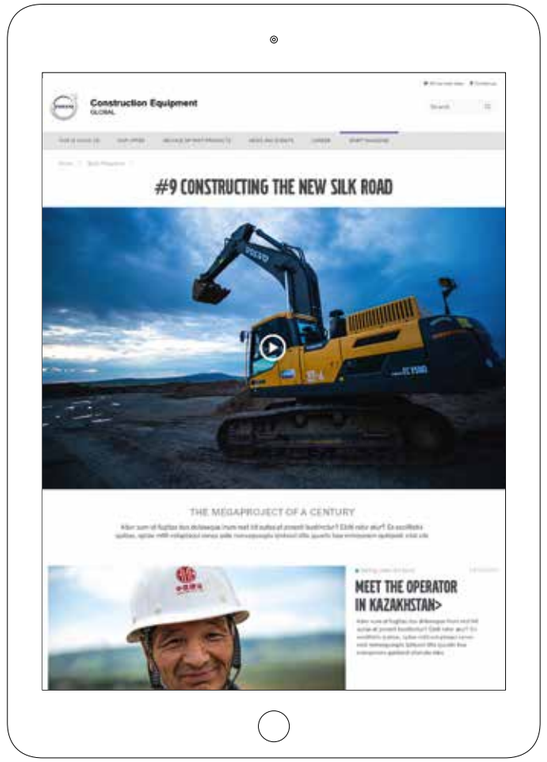
04 / REAL TIME KINEMATICS (RTK)

RTK stands for Real-Time Kinematics and is a technique that uses carrier-based ranging and provides much more accurate positioning than using normal GPS systems – as accurate as 1 cm.



SPIRIT ONLINE

The magazine you are holding in your hands is just one part of Spirit. On our global website volvoce.com, you will find more exclusive content from films to articles from around the world. Here are some highlights.



FOLLOW MEGAPROJECTS AROUND THE WORLD

Florida, Paris, Dubai, Bolivia, Sundarbans and Cairo have one thing in common – they are all home to a mega project. In The Megaproject Listing we follow projects which re-shape society and truly build tomorrow.

Come with us to these fascinating places and meet the people working on the mega projects. Video material, on site images, interviews and more on volvoce.com/spirit.

THE WORLD IS GOING ELECTRIC – BUT THERE ARE STILL CHALLENGES AHEAD

Cleaner, quieter and more productive electric machines are a commitment to building a better tomorrow. But now that the future of construction equipment has arrived, there are still a few more hurdles to jump before electromobility becomes mainstream.

DIVERSITY IN THE WORKFORCE A KEY TO SUCCESS

Balance is always better when it comes to business. Which is why Volvo CE embraces a culture that puts diversity and inclusion at the center of its success.

Read all about the news at volvoce.com

MEET THE NEW VOLVO ULTRA-COMPACT LINE

The new fully-immersive line of Volvo construction machines from Dickie Toys is its biggest – and smallest – yet. These realistic play sets are designed to open up Volvo Construction Equipment to a whole new audience of little diggers. All they need is some imagination and buckets full of dirt. Children large and small can now discover the thrill of construction without setting foot on the job site.

Volvo Construction Equipment
Building Tomorrow