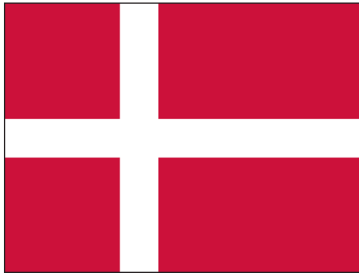


# **NEWS FROM YT**

**OCTOBER 2018**



# Contents



**Denmark**



**Germany**



**United Kingdom**



**Poland**

# yt network

“Creating a **network** which nurtures and develops young talents to tackle the challenges of **tomorrow**”

## Details of next meet up:

10th, 11th & 12th December

Aarsleff Grundbau GmbH

Friedrich-Ebert-Damm 111, 22047 Hamburg, Germany



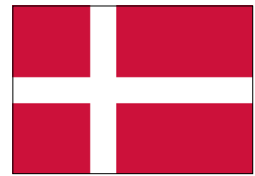
“During those great days in March in Copenhagen – thank you again Denmark – the German delegation of the Young Talent group was chosen with pleasure to host the next event.

To keep the interval of meeting every six to nine month we decided to arrange the event in Hamburg on December 10th to 12th.

As practiced on the previous events we will have a lot of inspiring themes and are looking forward to meeting the group members again to encourage the contact between the countries and their employees.

We will gather to be welcomed by the managing director of Germany Peter Wardinghus, have a construction site visit, be supported by external speakers and work on different skills with them and enjoy the Christmas time in the city.” - Nele Hennig

# Denmark





# Making History

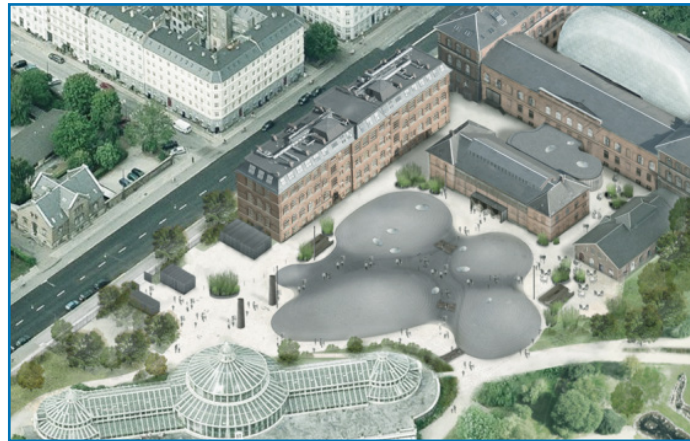
## 3D Geometry used to visualise a secant pile wall with anchors in two levels.

The project is a partly underground museum that stretches all the way across the existing museum, in addition with a new glass construction called the Ocean Hall. The final work will merge Zoological Museum, Geological Museum and Botanical Museum to a new museum of international top class. When it is finished in 2022 the visitors will be able to study both giant whale skeletons, exotic plants, rare meteorites and greet the museum's giant dinosaur 'Misty'.

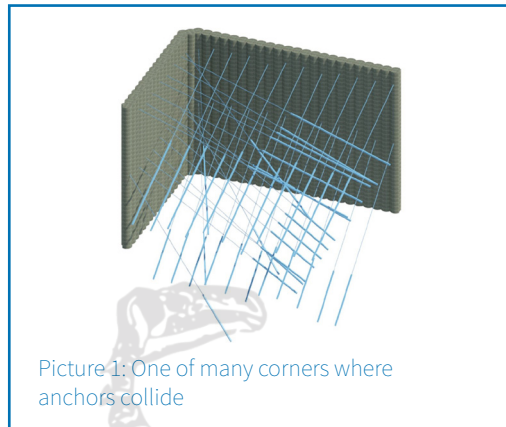
The initial work now consists of project optimization and joint design with the intention to coordinate and optimize the proposed solutions from the main contractor (Per Aarsleff) and the design teams detailed design/project. Before the optimization began it was agreed to use BIM/VDC which also was a part of the contract with the client. Within the Ground engineering department we have already begun to construct a 3D model consisting of a secant pile wall for the main underground museum.

### What are the benefits from using a 3D model?

First and foremost, the reason for building the ground work in a 3D model, is not because of the contract stating the use of VDC. It's mostly due to the need for collecting quantities, making drawings and heightening the quality of the design. One of the main challenges is that all the ground anchors could possibly collide during installation, especially where they cross each other. By first constructing them in 3D, we are able to modify each anchor, so that they will not collide.



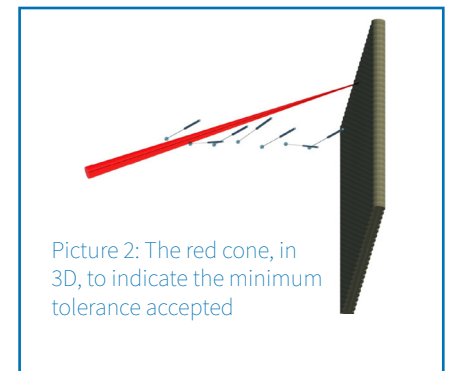
Peter Andreas  
Novak Hansen,  
VDC Coordinator



Picture 1: One of many corners where anchors collide

Furthermore, we can lower the risk, when we apply tolerances to the 3D object. In that way we ensure that even though the installation is slightly out of the intended, the anchors still don't collide. Previously this work was done by calculation and drawing 2D geometry on paper, which can be hard to comprehend when you have a lot of anchors with different degrees and levels.

In the 3D model, we simply add a tolerance cone, that can be modified differently according to the norm. Then we take one anchor at a time and modify the level of/and degree for installation. This digital process is more than 10 times faster and with a higher quality.



Picture 2: The red cone, in 3D, to indicate the minimum tolerance accepted

When all this is done, it is nothing more than two clicks and you have all the information exported to Excel, for further detailed design. Any changes done by the designer are just as easy to implement in the model again, and all the geometry will update automatically.

Before we reached this level of quality we naturally had some trial and errors, and then had to make some custom solutions along the way. The positive thing is that this is the first steps towards a more integrated way of collaboration internally. And hopefully it will result in less complications doing the construction phase later.

# Building bridges

Last year in December, Aarsleff entered into a contract with the National Railway Company to demolish two old bridges in Randers and build two new bridges. The project is a part of the preparatory works for electrification between Aarhus and Lindholm and the contract has a total value of approx. DKK 75 million.

I had the job to calculate the price for the foundation work, which included the installation of 3620 meters 400mm square precast concrete piles, 7435 m<sup>2</sup> sheet piles, 85 soil anchors, 220 meters steel hammer on top of the sheet piles and welding 3690 meters sheet piles locks. The Site Manager on the project from Ground Engineering had summer holidays from 23 July to 13 August, which meant they needed a replacement and I was therefore asked, because I had prior knowledge of the project. My role was to supervise the installation, test 43 soil anchors and all the forging.

It was my first time working on a One Company project and I have therefore learnt a lot about the collaboration across the divisions. The foundation work was finished in August, but the project is expected to complete in May 2019.



Stig Mikkelsen  
Site Manager

## July 19th - Viborgvej



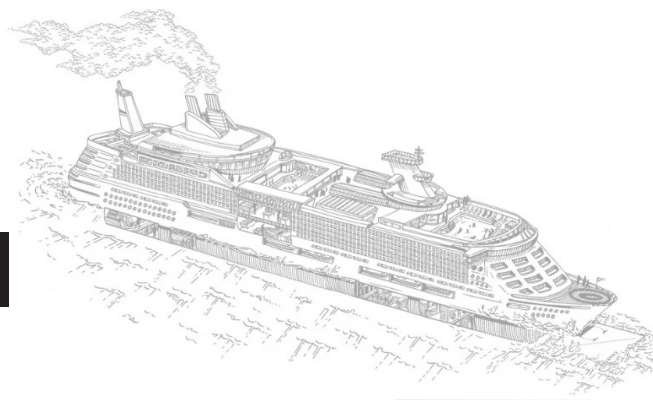
## August 16th - Viborgvej



## August 16th - Parkboulevarden



# First port of Call



## Data

The Expansion of Rønne Port is the initial step to secure the future of Bornholm in the aspect of tourism and other activities in Østersøen. Bornholm profits largely from tourism and the expansion makes it possible for large cruise ships to visit Bornholm and will additionally act as an intermediate station for industrial activities such as offshore windmill projects. The expansion is located south of the existing harbour and the client is Rønne Havn A/S who has Niras as their consultancy. A turnkey contract was made between Aarsleff and Rønne Havn A/S with Sweco as our consulting engineering company. The quay was designed as an anchored combi-wall system consisting of king piles and sheet piles that supports a heavy-duty quay area with the surface load capacity of 800 MPa. The water basin is excavated to level -11m to handle the large cruise ships that may draft up to 10 metres. The harbour area is surrounded by one kilometer of breakwater with a core structure of smaller stone materials, an outer structure of medium sized boulders of 5-9 ton and lastly covered with large boulders of 15-19 ton.



Anders Kjær Huntley  
Site Manager

## Project/site managers/labours

In the Ground Engineering segment, we are nine operatives in total including seven labours, one foreman, one site manager and one project manager.

The site is located at the Danish island Bornholm and is only accessible by ferry, which means that the working hours are like working abroad from six in the morning to six in the evening six days a week for three weeks at the time.

## Materials

The combined wall system consists of king piles as the bearing element and sheet piles in between. The wall system is supported by anchors in each king pile. There are 409 king piles (HZ-1080MA/880MA) with an average length of twenty on metres and 445 sheet piles (AZ26-700D) with an average length of seventeen metres. The total weight is nearly four thousand ton.

## Weather sensitive, both waves and wind

Rønne Port is the second worst port in Denmark with respect to waves and strong winds, which increases the production sensitivity since most of the ground engineering is made offshore.

## Equipment

We are well equipped at Rønne Port with a large Junttan HHK14t hammer for the king piles, which can produce 206 kNm, an IHC S90 hammer for sheet piles and two vibrators, an ICE 1412C vibrator (capacity of 120kNm) and a PVE 40VM (capacity of 40kNm). We work from two of Aarsleffs own barges, Jack VI and AA102.



## Procedure

Two parallel setups is operated by two teams with one crane each, a Sennebogen 180t crawler crane and a Liebherr 100t telescope crane. One setup, Junttan hammer, ICE vibrator and the Sennebogen crawler crane is operated from barge AA102 and vibrates the king piles as deep into the ground as possible and drive them to final level. The second setup is on Jack VI and have the IHC hammer for sheet piles, PVE vibrator and the Liebherr 100t crane and does similar operation but with sheet piles instead of king piles.

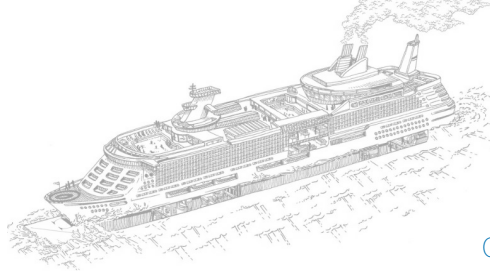
## Environmental requirements

Our setup produces a good amount of noise and are naturally subjected to requirements from the authorities due to the inhabitants surrounding our worksite. We are obliged to work within this framework, which is from seven in the morning to six in the evening, Saturdays seven to two. We ensure that we meet the noise requirements by having CP test A/S help us measure the noise produced during our production.

## Time schedule/deadline

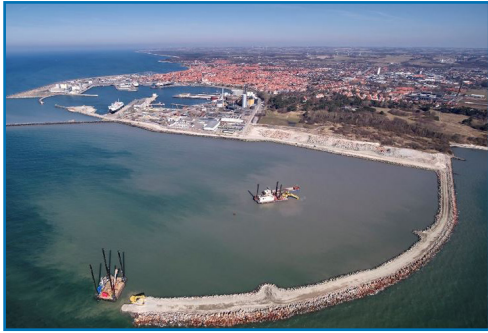
The ground engineering part stretches from May 1st to March 1st and includes driving all king piles and sheet piles and anchoring them to anchor plates.





Overview [April 8th 2018]

Overview [August 17th 2018]



Rune Tranborg Tuxex  
Operations Manager

## Mission Complete: Protecting a Stucco ceiling against effects of unwanted Building Vibration

In cp test a/s, one of the three testing companies in Aarsleff Ground Engineering, we do a lot of environmental monitoring, especially building vibration and normally the acceptable level of vibration for a given structure can be found in an official Norm or Standard. As part of the renewal of the Danish Baroque castle “Augustenborg”, I have been involved in the task of protecting an invaluable stucco ceiling in the Conservatory “Havesal” against destructive vibration coming from the renewal works. The Conservatory is located on the ground floor of the castle. On the two floors above, demolition of concrete floors and masonry walls as well as many other construction activities were to take place. The activities were predicted to cause large levels of vibration inside the building if they were not regulated and to some extent limited. The demand from the owner of the castle, the Danish Government, was that the ceiling was to be unharmed and that no cracks or further development of existing cracks could be accepted. In order to regulate the building activities causing vibration to the ceiling of the conservatory cp test a/s in corporation with the general contractor, I planned and arranged a vibration measuring program. Also, alert levels for the vibration measured at the ceiling were determined empirically as no official limitations for vibration of plaster stucco were found. Vibration monitoring was performed simultaneously in five different places in the floor separation above the stucco ceiling. Alerts were given visually to the constructions workers in the building and via SMS to the project engineers. Measuring data was transmitted “live” to a website accessible by the general contractor and cp test a/s. As the vibration monitoring concluded, no harm to the ceiling was observed or reported – in all a unique and interesting task to solve.



# Germany



# Summer in Sweden

## Sverige – Åkersberga



Swedish summer season, that includes holiday time for many local employees. Because of those long days and during this year unexpected high temperatures, it is common in Sweden to spend the “semester” out of town. Within this time Aarsleff Grundläggning got some support at the department of Stockholm by Aarsleff Grundbau (Hamburg – Germany) for the site management of a project in Åkersberga – Båthamnsvägen. The northern suburban area of Stockholm is connected by the train Roslagsbanan with the city center of the capital of Sweden.

Due to the ground conditions and the design of the expansion of the station in Åkersberga, the client requested the foundation works in an area of about 350m length in the south west of the town. The contract includes the production of 960 precast-concrete piles with approx. 12600 m for the foundation of the embankment, retaining wall and a bridge with two abutments and two pillars. According to the time schedule of the project the production was divided into two parts. The preliminary foundation with KC-pillars is not given with exact

positions, so the first part on the south of the truck requires a pre-drilling model for the driven piles, to be sure not to hit the KC-pillars with the precast-concrete piles. The Junttan PM 23 has driven 480 piles in the first part and the other half will take place in spring 2019.

With its variety of technologies Aarsleff Grundläggning got the job for the execution of sheet pile walls in 4 different parts with a Volvo excavator-mounted Movax vibrator and RD-piles with a DT-145 drilling rig at Åkersberga station.



Nele Hennig  
Site Manager





# Working with Sound

Since the last Young Talent meeting I have been responsible for many different projects, overseeing each scheme from initial quotation and delivery of project to final account and invoice. In particular, I worked on a highly varied and complex project in Hamburg. The project still isn't finished now.

To start construction of the new building, an old building had to first be demolished. Before the demolition company started, I had to do a forecast of the expected sound emissions as a result of the different building processes. The different building processes comprise the demolishing work (divided into demolishing work above ground and underground), shoring work (divided into drilling work and driving sheet piles into the ground) and manufacturing the sole of the underground garage. Within the different sound forecasts, I had to calculate and evaluate the sounds for the next relevant emission locations. I also had to draw up a grid noise map for the different sound forecasts and if necessary give advice for possibilities to reduce the noise emissions.

Because of the short distance between the demolishing work and the nearest buildings (minimum approximately 5 m) I did vibration measurements at the next 5 buildings to monitor the vibration emissions and warn before the vibrations reach a critical level.

Furthermore, I did noise measurements and dust measurements approximately every 2 weeks to monitor the noise and dust emissions and subsequently gave advice for reducing the noise and dust emissions when deemed necessary.



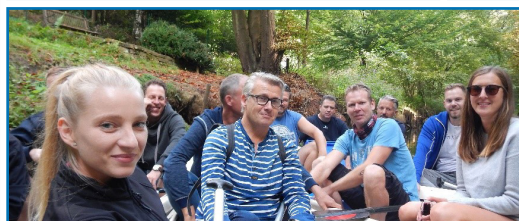
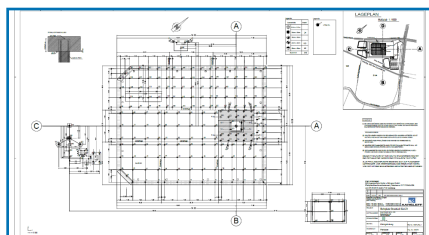
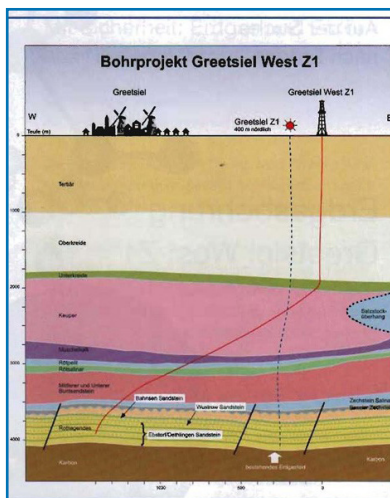
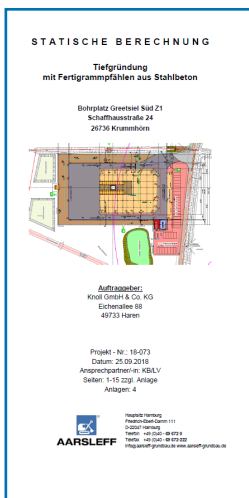
Nils Christian Witt  
Project Engineer

## And it starts again...

...after a calmer summer and holidays, the pressure in the office is rising. With many interesting projects commencing in the next few months, we are fully running. The planning, calculation of statics, drawing of plans and organising of documentation keeps us busy in the office all the time. In addition, there is always a time or situation that makes you learn something new every week. At the end it doesn't matter that you have calculated a large number of similar statics, because there is always something extra to make your life more interesting in each of them. One of the "sweet" projects that we just finished was a factory of Toffifee... yes the chocolate candies and no unfortunately we don't have the office full of it! One current project also worth mentioning is a drilling station of natural gas in Nord Germany, Greetsiel. We calculate that we need more than 200 piles of different profiles and lengths. At the moment we are waiting for permissions or in German "Freigabe" and planning the last steps before commencing work on site. I need to admit that we are not working 100% all the time, we find also time to refresh our minds and body!



Katja Belak  
Project Engineer







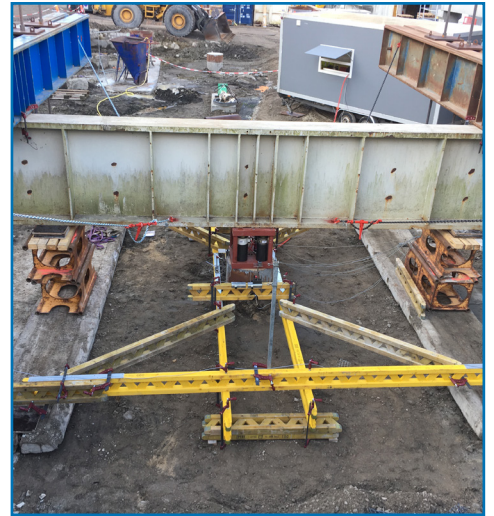
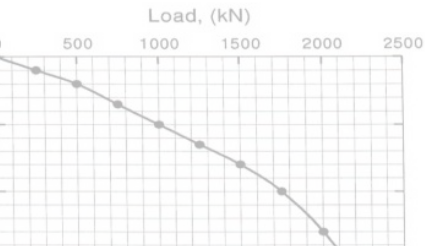
Matthias Bartsch  
Project Manager  
for Pile Testing

# Ready. Set. Test

In the beginning of 2018, DMT Gründungstechnik GmbH took over the execution and equipment for static load testing from Per Aarsleff A/S Denmark. In the course of restructuring and transferring parts of the equipment to our new storage location in Germany, I have contributed the knowledge I have acquired throughout the years in static load testing. I have optimised and extended the offering of the existing material to ensure future success in the market. For example, I have designed a press unit which allows us tension and compression forces up to 400 tons.

Thanks to close cooperation with my colleague Rune from cp test A/S, we have already successfully performed static load tests in Denmark. Furthermore, we were able to extend our business performing static tension tests as part of the ongoing expansion of several new power lines in Germany for the next years.

In the beginning, entering the market seemed a difficult undertaking, I am now aware that we have succeeded in this challenge and look optimistically to the future.





# United Kingdom



# Delivering Aarsleff's largest project in 2018



Parth Patel  
Contracts Engineer

Over the past 4 months I have been working on the Eastwood Park Project. This is a driven precast and steel tubular piling scheme worth a staggering £4.5m. This is the largest project Aarsleff UK have delivered this year. The development involves the construction of two warehouse buildings with associated integral offices. The two units have a combined area of over 600,000 ft<sup>2</sup>.

## Ground Conditions

The ground was reported to be soft, often waterlogged engineered ground with temporary ponds. The site was previously worked as an opencast coal mine and left a split-level void with a shallower excavation, 20m below existing ground level east of the site and 35m below ground level to the west of the site. The voids were backfilled with a mixture of colliery spoil and mine washings into purpose-built lagoons. The majority of the site was unsuitable for conventional pad foundations. Ground improvement was also disregarded as a foundation solution. It was proposed that these areas will require the use of end bearing piles to carry any developments.

## Design

Leading up to the project, Aarsleff had attended several pre-start and design meetings to value engineer the scheme for the client. The designers managed to tailor the project to suit Centrum pile sizes and capacities. We developed a very good relationship with the client and designers.

## Delivery

We successfully installed over 7,000 No. Piles (115,000+ metres) of both precast and steel tubes. Over a period of 16 weeks. This was achieved using 6 No. Piling rigs. 4 of which were Junttan PM20's and 2 No. Banut 700 rigs. The precast piles were Centrum 250 & 350mm diameter piles and steel tubes were 244/250 & 273mm diameter.

## Experience

As the Contracts Engineer it was a thoroughly enjoyable and challenging experience. We had a great on-site team of over 20 Aarsleff operatives who were involved with the delivery of this project. I have gained invaluable experience and Aarsleff have built a great relationship with the client. I have since been delighted to receive the following feedback from our client:



“ I am the Senior Project Manager on the above scheme, on which Aarsleff have carried out a £4.2M piling scheme over two units for a 16 week period. From our very first pre-tender meeting, it was quite clear the Aarsleff were very professional and eager to be of assistance in resolving any technical issues and of course secure the contract. Following various reviews (also attend by the MD), we finalised a deal and agreed the programme. Aarsleff then got heavy involved with our consultants and were again very cooperative in finalising all the design and resolving any issues. We agreed start dates and these were met promptly from both sides. This was a very challenging project, with uncertain ground conditions. As a result of this, some of the early pile lengths weren't achieving the design intent. We all worked together to ensure this initial problem was resolved, with no technical implications. Following all these upfront challenges, the job went very smoothly. The site team was well managed by Parth Patel. Parth had a very approachable manner and worked well with the BGCL site team and the rest of the supply chain. Parth's technical knowledge and good team ethos was key to the project. Despite the many challenges we had, we continued to work well together and the job was completed to our agreed programme. The best demonstration of a successful scheme is that we didn't have one hour of standing time. On a job of this scale, this is pretty unknown. I look forward to working with Aarsleff and Parth again in the very near future.

”



# Wish you were here...

Traditional literature are amongst the first marketing items that our potential customers will come in contact with - whether it's a client waiting for an interview or a student attending our careers fair stand. I want to embrace those small moments, and make a first impression on them through visual context. I've been creating a series of Postcards detailing the techniques the company offers. Each postcard displays a scenic photograph, a short description of the technique, its applications and their advantages. I believe the postcard is creative yet informative, attractive yet useful, and thinks outside the box just enough to attract prospects, customers and students alike. If you look closer at the stamp, I've included the year of Per Aarsleff A/S establishment, and the year of Aarsleff in the UK's establishment - I like paying attention to the little details.



Jessica Banham  
Marketing &  
Communications  
Manager



## Driven Precast Piling

Aarsleff Ground Engineering offer Driven Precast Concrete Piles to its clients. Due to the possibility of carrying vertical and horizontal loads as well as bending moments, precast piles are used as foundations for all sorts of engineering structures in virtually every soil condition. They are particularly useful where there is a need for very deep piles, in soft ground or in aggressive or contaminated soils.

- ✓ Piles are manufactured in a quality controlled environment
- ✓ Driven piles require no curing time
- ✓ Lesser amount of plant and fewer traffic movements are required to/from and on a site when compared to alternative piling methods
- ✓ The installation generates no spoil or arising during installation

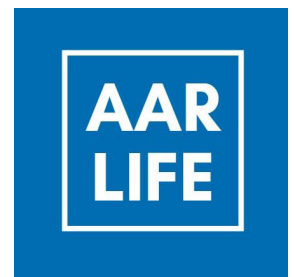


www.aarsleff.co.uk  
01636 611140  
enquiries@aarsleff.co.uk

*Precast concrete piles are installed in the ground by using pile driving equipment. Piles can be a single section, or several sections can be jointed to provide longer piles for deeper ground conditions.*

This Summer, I also launched 'AarLife' - a series of posts on our social media and website blog providing glimpses of those who work at Aarsleff Ground Engineering. To learn more, you can view the launch video I created here with our new Video software, Powtoon: <https://www.youtube.com/watch?v=gTKVUtKGkTU>

Finally, I recently developed an area on our website specifically for internal communications with our Site Operatives. Each Site Operative registers as a member with a Unique log in. As admin, we can then approve or reject their membership. The online 'messageboard' is a safe and accessible way for us to distribute safety alerts, reminders and memos. We can also link to documents if we require them to download something.





# Iceland

On the 11th March, I travelled to Reykjavik in Iceland to supervise on a vertical and raked driven precast piling job. The piling will provide the foundations for a new multi-storey residential development for main contractor Istak. Istak are actually one of Iceland's leading civil engineering contractors, who Per Aarsleff acquired in 2015 to give Group access to new markets in Iceland, Greenland and the Faroe Islands. The project - called Keilugrandi - comprised four separate blocks, from two to five storeys, containing 78 apartments. The end client is Búset, a social housing co-operative. We first transported our Junttan PMx22 rig from the UK to install the piles which were themselves manufactured in Sweden by Centrum Pile - a nice example of One Company collaboration!

One of the reasons the raking piles were required was to provide increased lateral stability in the event of seismic activity. In an average week Iceland's national monitoring seismic network detects around

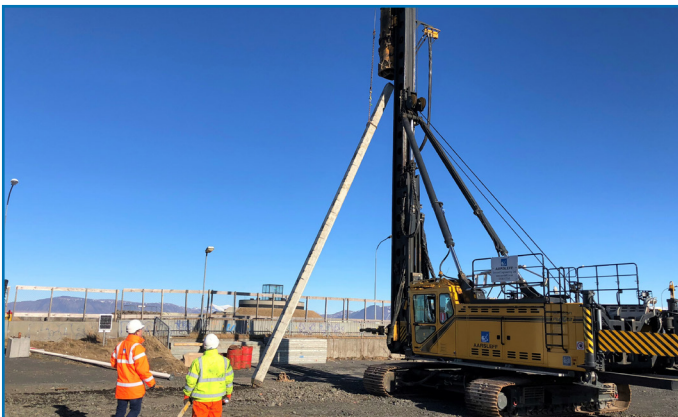
500 earthquakes. The reason for this seismic activity is the location of Iceland on top of the Atlantic ridge, the divergent boundary between the Eurasian and North American tectonic plates.

For this project, we installed 270mm square in section piles driven through soft fill, founded in rock at depths between 7m and 12m. One of our longest serving rig-operators Richard Judd drove the piles, installing 267 No piles, some vertical, others raked at an angle of 10°. Due to the angle of the piles, I supervised Richard on the exact sequence of pile position and rig orientation to ensure no piles were missed out, and we weren't in a position where it would be impossible to drive any of the piles in. We completed the work a full three weeks ahead of schedule. British designers tend to default to large-diameter vertical bored piles, though in mainland Europe, driven precast concrete piles are often the norm. The last time we installed raked piles was in 2015 for a six-lane toll bridge abutment. It's been great gaining the

valuable experience from a project like this, and also refreshing to have a change of scenery. Iceland was a beautiful place to be.



Simon Cottington  
Senior Contracts Engineer



# Poland







# Demonstrating the advantages of Driven Piles

Recently we managed to gain and execute a few new contracts. I would like to focus on one of them which deserves special attention. It was a contract in the town of Daleszyce (near Kielce): "Construction Provincial Road number 764". We worked there from August 2018 and we had the opportunity to drive precast piles. This contract was important to us because we were invited on to the building site as representatives of Design Studio from Kielce, because we would like to start a long-term cooperation with them. They design a construction of production halls, commercial and residential buildings. The scope of AARSLEFF's work included the foundation of four bridge supports based on precast piles 30x30 and the protection of two supports with a sheet pile wall. We focused on the presentation of driven technologies.

The aim of this meeting on the building site was to show the technology of driven precast piles and discuss about possible applications of presented geotechnical works. Additionally, participants had the opportunity to participate in the dynamic testing phase which took place that day. They also saw a prepared static test stands. The designers asked about details and the impact on environment. We tried to solve all doubts. The constructors had the opportunity to learn about the advantages of driven precast piles like a relatively short time of installation, high quality of the product. Another advantage of precast reinforced concrete piles is possibility to carry out work in low air temperatures and driving piles. We have a lot of hope that we managed to convince them that it is worth to use a precast piles and they will be open to implement this technology in their projects. Building long-term and good relationships with designers is very important for us, because each contract starts from the design phase.



Sylwia Bajek  
Sales Specialist



# Collaboration and Creativity



Natalia Pamuła  
Marketing &  
Communications  
Coordinator

Over the past few months, I have actively participated in a number of projects that have provided me – a person with an engineering degree – with a lot of experience, especially in cooperating with other people, and enhancing my creativity.

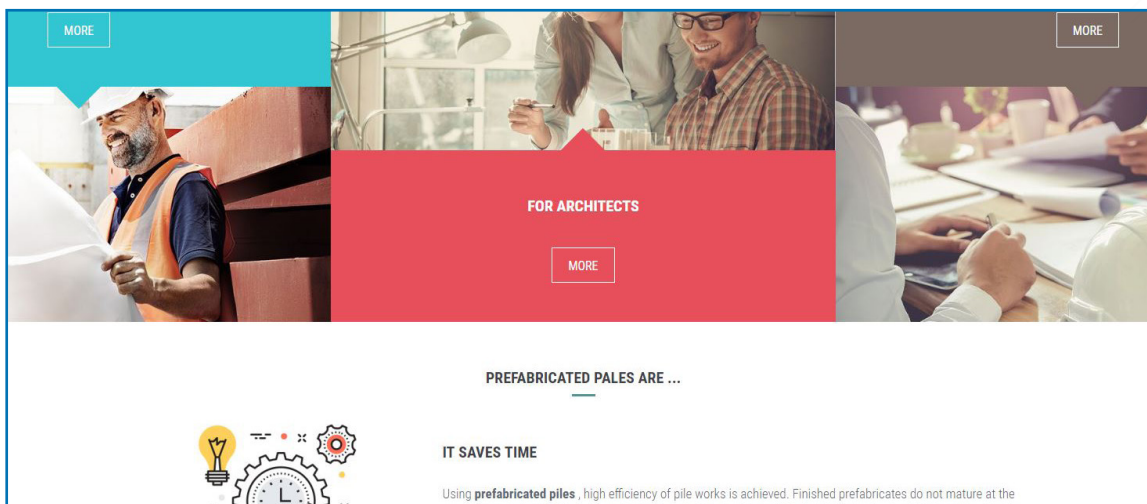
Among the major projects I'm currently working on with other people is the website: [www.pale-prefabrykowane.pl](http://www.pale-prefabrykowane.pl) (Precast Pile Vortal), aimed at development of the precast reinforced concrete pile technology, which is the most reliable, transparent, widely available and easy to design and execute deep foundation technology. The vortal provides all the necessary information and tools for designing piled foundations and precast piles. Moreover, it is a great source of knowledge about precast piles, as well as designing scenarios, calculation formulas, drawings, case studies and technical specifications. It also contains information

on the economical and organizational aspects of applications of piles and piled foundations, including precast piles. The portal is being developed all the time, with new contents usually posted every two weeks. It was established on 25 April, 2018 and since that time it has attracted over 6,500 users and 1,700 Facebook likes (<https://www.facebook.com/paleprefabrykowane/>)

Another project I participated in, important not only for me, but also for the whole Young Talent group, was the establishment of my own communications network within Bitrix2: <https://aarsleffyoungtalents.bitrix24.com>. Owing to that we can all the time stay in contact and exchange knowledge and experience, distribute interesting information, make plans and arrangements etc. on an on-going basis. I am convinced that this platform has greatly facilitated communications between us.



## PALE-PREFABRYKOWANE



MORE

MORE

FOR ARCHITECTS

MORE

PREFABRICATED PALES ARE ...

IT SAVES TIME

Using **prefabricated piles**, high efficiency of pile works is achieved. Finished prefabricates do not mature at the



# Mountain slope vibrations



Michał Maj  
Metris  
Monitoring Area Manager

Since our last meeting in Copenhagen, there was a change of our Manager, and because of that I received some new responsibilities. As part of Metris' new structure, I am now leading the vibration measurement department. This includes taking care of all our vibration projects, making reports, order and delivery of accelerometers to the site, meetings on site with managers and occasionally making measurements. Alongside supporting my Manager in supplies and logistics, I am also preparing our company for next year's budget. I have no significant project to show off, just daily routine, but after the management change, the challenge has been to ensure systems are in place, and everything is running smoothly. Since July also Per Grud, - the Manager of CP Test and DMT, became our new supervisor and we have to adapt everything in Metris to the standards of all other test companies in PAA Group.

Next year we are planning to develop some new services for the local market. First of all, Poland is a country with high landslide risk in the southern part, and we have now started to perform inclinometer measurements, to describe displacement of mountain slopes. Furthermore we are planning to start measurements on tunnels and dams, and for this purposes we have purchased some new wireless gages which we can operate in cloud, and carry out constant monitoring without spending time on site. Now I have to learn how to operate them. That's why I also go on post-graduate studies since November!







Jan Grobelny  
Site Engineer

# Residential Piling

Recently I was in charge of two interesting piled foundation projects executed in the centres of Opole and Kołobrzeg. The greatest challenge was the close proximity between the construction site and the residential buildings. In both the cases, precast piles turned out to be definitely the most advantageous technology due to specific soil conditions and economical reasons. When introducing the precast pile technology into cities, we are faced with the challenge of monitoring vibration and noise levels during piling works. Both the projects consisted in the construction of multi-family residential buildings in new housing estates. The precast piles were installed under the foundation slab, on which the building structure would later be erected. We applied the following solutions to minimise the impact of piling work on the surroundings:

- Vibration sensors were used during the works. On-going monitoring of vibration levels allowed for adjusting hammer frequency so as to minimize vibrations;
- Soil relaxation was applied along the walls of the nearest buildings in order to limit horizontal vibrations;
- Piling was intentionally stopped once the required pile capacity based on the previous tests was achieved. This enabled us to avoid pile driving with maximum resistances generating the highest vibrations;
- Pre-drilling for piles was carried out in order to loosen the upper layers of soil transferring vibrations;
- Acoustic screens were used to significantly limit the noise disturbing the inhabitants of the neighbouring buildings.

Owing to the application of the above solutions, we were able to successfully complete the projects in Opole and Kołobrzeg and gained valuable experience to execute piling works in the very centres of other cities.



