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**The Fehmarnbelt fixed link:  
Like a lift in a skyscraper**

***"In Hamburg, cultural life is blooming, but for many Danes, Hamburg might as well be in Russia. There are Danish tourists in Hamburg, but they are from Jutland. The vast majority of people from Zealand, Copenhagen and Scania in southern Sweden only know Hamburg as a spot on the map which they have to drive past on the way to their holidays in southern Europe."***

That's what Christian Wichmann Matthiessen, Professor at the Institute for Geography and Geology at the University of Copenhagen says. When recently giving several presentations to business people in both Germany and Denmark, he has noticed people have a big lack of knowledge about each other.

"In Hamburg, I have seen German business people surprised that Copenhagen has a really large B2B sector and that the city is not just a romantic backdrop for tourists," he says.

Christian Wichmann Matthiessen can thus see that Germans, Danes and Swedes know too little about each other. That means we don't immediately see the potential which increased integration across borders in a Fehmarnbelt region would lead to. That goes for both the business and research potential, as well as cultural and personal development potential. ▶

Visit

**femern.com**

for further information about  
the Fehmarnbelt fixed link.

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Femern A/S  
Vester Søgade 10  
DK-1601 Copenhagen V  
T 33 41 63 00  
F 33 41 63 01  
E [info@femern.dk](mailto:info@femern.dk)

### **Big need for knowledge**

But now a team of researchers from Germany, Denmark and Sweden, under the leadership of Christian Wichmann Matthiessen, has decided to illustrate the regional perspectives in the Fehmarnbelt region with the focus on facts, opportunities and barriers.

“Particularly in Copenhagen - but also in Scania - there is a very strange lack of knowledge about Hamburg. Danes and Swedes know a lot about Berlin, which we think is a great city, but we regard Hamburg as a boring old industrial city with smoky factories. But Hamburg is actually a modern, efficient, international and wealthy business city which is the headquarters of many banks and insurance companies and has Europe's second-largest port. By comparison, Berlin does not have as many large companies in the centre of the city - for example it is a state-owned company which has the greatest presence at Potsdamer Platz, which is Berlin's new centre,” says Christian Wichmann Matthiessen.

“So I am absolutely certain that one of our conclusions in the research project will be that we have to start massive information and marketing campaigns in Denmark and northern Germany. There will be a need for the city centres to draw attention to themselves and generate a more precise and nuanced image, for both shops and businesses as well as tourists.”

### **The future is in high-speed trains**

A fixed railway link across the Fehmarnbelt also has a high priority for the EU when it comes to the development of the Trans-European Transport Network. Christian Wichmann Matthiessen points out that high-speed trains will be necessary on the Stockholm – Copenhagen – Hamburg route:

“The Fehmarnbelt project is simply too big a chance for getting high-speed trains to let it slip away from us. Personally I am in no doubt that they are the future, because trains can compete with planes when it comes to time, comfort and the environment. Take, for example, the route from Paris to Lyon, where the TGV train has seen off the air route, and look at Eurotunnel, where air traffic is hard-pressed on the routes between Paris, London and Brussels.”

According to Christian Wichmann Matthiessen, the experience from Eurotunnel shows that the hubs of London, Paris and Lille have had the biggest gains from the fixed link between England and France. The same applies to the Storebælt fixed link, where Copenhagen and the Trekantsområdet - the area between Vejle, Kolding and Fredericia in Jutland - have seen the greatest effects.

“It's like installing a lift in a skyscraper. It leads to the biggest improvements in transport and exchange between the bottom and top floors. All the other floors see improvements too - but to a lesser extent than the endpoints,” explains Christian Wichmann Matthiessen. ►

### **The young and the famous**

Part of the research project is based on interviews with young people from Germany, Denmark and Sweden as well as with prominent cultural figures in the Fehmarnbelt region.

"We intend to interview between 20 and 25 well-known public cultural figures who have practical experience of living in the region. The first one was Princess Benedikte, who is of course married to a German and has been active in the area for many years," says Christian Wichmann Matthiessen who continues:

"In another interview survey, we questioned 1,000 19-year-olds in the region. They are at a stage in life where they have thought about their future a lot and have lots of opinions about it. We ask about their values and how they experience the society they live in and investigate what they want from each other across borders."

In a corresponding survey prior to the opening of the Øresund fixed link in 2000, Christian Wichmann Matthiessen documented that Danish and Swedish young people had roughly the same values, and that there were greater differences between young men and young women than there were between people in Zealand and in Scania. At the time it could also be seen that young Swedes knew a lot about Copenhagen, whereas young Danes knew virtually nothing about Malmö. Whether that has changed since then is what Christian Wichmann Matthiessen is currently investigating in a new round of interviews with the young Danes and Swedes.

### **The local perspective**

The perspective for the areas close to the Fehmarnbelt, i.e. Lolland and Holstein, are that with a fixed link they will become what Christian Wichmann Matthiessen calls "real" border regions.

"Today, they are remote areas without any particular contact and exchange with each other. The existing ferry link doesn't allow any actual collaboration across the border and the areas in both countries are dead ends which no one is really interested in. As a result of this, the prices of land in the areas can be atypically low - I feel that is definitely the case for Lolland. A fixed link can contribute to raising the prices of land in the region close to the Fehmarnbelt up to a more normal level."

"A fixed link will also give the local areas the potential to present themselves as a single combined region just as is the case with Southern Jutland and Northern Schleswig or the Zealand – Scania region. But there will have to be new thinking alongside the Fehmarnbelt Link's abutments and one opportunity could be to establish a German - Danish cultural institute or a cross-border university in the Fehmarnbelt region," says Christian Wichmann Matthiessen. ▶

The research project entitled "The Fehmarnbelt Fixed Link – regional development perspectives" is being undertaken for Femern A/S and is expected to be complete in mid-2010. Christian Wichmann Matthiessen has been involved with research in city and regional development at both European and international levels for more than 20 years.

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## Increased collaboration creates growth

**Size, good infrastructure and a high level of education are crucial factors everywhere for success and growth. When their strengths come together across national borders, the areas around the Fehmarnbelt will be particularly well-placed.**

An actual Fehmarnbelt region with Hamburg and the Øresund region as the dominating centres is still however rather unclear in size. But the western part of Mecklenburg Vorpommern, the whole of Schleswig Holstein as well as Bremen and Lower Saxony have shown political and economic interest in working together more. In the whole of this region, there are 18 million inhabitants spread across three countries and an area of 109,000 km<sup>2</sup>.

"The region is already attractive because we have fantastic universities, research institutions and companies", says Dr. Rolf-Barnim Foth from the Senatskanzlei in Hamburg, which is responsible for regional development.

"In a globalised world, urban and rural regions are coming together to improve their competitiveness and visibility. From a global perspective, the Fehmarnbelt region is as such already a meta-region for the Western Baltic. We are traditionally good neighbours in the area and there is lots of potential for more intense partnerships", says Dr. Rolf-Barnim Foth.

"I think that the STRING partnership along the Hamburg - Scania axis can become the central collaboration body working towards closer partnerships between northern Germany, Denmark and Sweden. But it should not be a closed club. There are lots of interests outside the actual region who would like to join in. For example, we are right now opening a Knowledge Corridor in material science. It is a partnership covering Oslo, Gothenburg, Aarhus, London, Copenhagen, Kiel, Hamburg and Rostock ", says Rolf-Barnim Foth.

Rolf-Barnim Foth underlines that there is a large number of equivalent groupings in the logistics, aircraft, maritime life sciences, IT, food and creative industries which will blossom as a result of closer collaboration.

The STRING partnership was established in 1999 as a collaboration between regional politicians and public authorities from the Scania

Region in Sweden, the Capital Region of Denmark, the Zealand Region in Denmark and Schleswig-Holstein and Hamburg in Germany. Around 8 million people live in the STRING region.

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## The first concrete for the fixed link has been cast

### ***The first test castings of concrete for the Fehmarnbelt Fixed Link are underway.***



*Consultant Martin Kaasgaard, Technological Institute, together with the first concrete for the Fehmarnbelt project.*

Femern A/S has entered into a contract with the concrete centre at the Technological Institute which will function as the company's concrete laboratory over the coming years. The objective is to develop a concrete which will last for at least 120 years.

During the winter of 2009/2010, the concrete centre will cast 15 large blocks of various different types of concrete which will be sunk into the Fehmarnbelt as they are ready. That will make it possible to follow the development of the concrete and its reaction with the local environment.

The concrete blocks, which each measure 2m x 1m x 0.2m, will be placed in the water off Rødbyhavn, where a 'field exposure site' is being prepared for the purpose. Five times over the course of the coming nine years, the Technological Institute will drill and extract cores for analysis.

Some of the concrete blocks will also be equipped with various sensors, so that they can be monitored on an ongoing basis for a number of properties important to durability.

Based on the report from the Technological Institute, Femern A/S will prepare the specifications of the concrete for the project, i.e. the formula to be applied to concrete for the construction of the Fehmarnbelt Fixed Link. Within the framework of these overall specifications, it will be the construction companies who select the type of concrete to be used during the actual construction.

Experience from the test castings will give the construction companies specific experience with the type of concrete they select.

An additional benefit is that the test castings will provide new knowledge about a number of modern types of concrete – knowledge which can benefit the whole industry.



## Extensive planning of the railway line initiated

***Significant expansion of existing railway lines has to be undertaken in both Germany and Denmark in order to get the full benefit of the fixed link over the Fehmarnbelt.***

The first public hearing about the Fehmarnbelt project's 119 km railway line in Denmark between Ringsted and Højby is now complete.

It is the Danish Public Transport Authority, which as the responsible body for the upgrade of the Danish railway lines, has had the project in a public hearing. The idea phase - which this hearing is also called - ran from 15 September to 1 November 2009.

During the period, the public transport authority received 44 written submissions from the public, companies, municipalities, associations etc.

According to the Public Transport Authority, their content is broad-ranging and full of ideas and comments, such as suggestions for new routes for the railway lines, use of the traffic potential and other capacity expansions. For example, a reply from the regional council in the Zealand Region includes a wish that trains should be able to travel at least 200 km/h on the new stretch of track right from the start.

The Public Transport Authority is now processing and evaluating the numerous submissions which will be incorporated into the project as far as possible within the bounds of the planning law, as well as with consideration for financial, technical and environmental aspects.

The examination of submissions and the Public Transport Authority's evaluation will be described in a hearing report expected to be issued at the start of 2010. ►

At approximately the same time, the Public Transport Authority will initiate the technical planning and an environmental impact assessment of the project's effect on the surroundings, including noise impact.

The environmental report for the railway land works is expected to be issued at the start of 2011, when a new public hearing will be held. During this period, meetings will be held for the local public in the various geographical areas along the route.

The Danish railway works for the Fehmarnbelt project include electrification from Ringsted to Højby south of Holeby as well as the laying of dual-track line from Vordingborg to Masnedø and Orehoved to Højby. A twin track across the Storstrøm bridge will not be built.

The project includes among other things a study of the land needed for the project, including the extent of expropriations and expansion of existing bridges, noise dissemination and protection and determining the inconvenience for existing traffic during the construction period.

As far as possible, the new line will be laid alongside the existing railway and for speeds of up to 160 km/h. In accordance with the planning law, the consequences of building the railway for speeds of over 200 km/h will also be investigated.

See more about the Danish railway land works on the Public Transport Authority's website: [www.trafikstyrelsen.dk](http://www.trafikstyrelsen.dk).

#### **Full steam ahead for German Railways**

In Germany, the 89 km railway line between Lübeck and Puttgarden has to be upgraded and electrified. Deutsche Bahn (German Railways), which is responsible for this task, is going full steam ahead with preparing a provisional design for the line. Various options for the expansion are being investigated along with the technical implementation.

Up until the end of December this year, Deutsche Bahn will also be in charge of the initial work on the route, including various measurements and surveys of the soil and groundwater.

Once the provisional design is complete, the planning work will have reached a point by 2012 when the German planning approval procedure can be commenced. The plan approval authority is the German Railway Directorate. The directorate investigates plans for the railway with regard to fulfilling legal requirements, namely with regard to noise and environmental protection.

The associated documentation is publicly available. Everyone involved has the opportunity to present their ideas and objections in the hearing procedure. The hearing procedure will be run by the hearing authority of Schleswig-Holstein, the Directorate for Highway Building and Transport. ►

Deutsche Bahn expects that the actual construction works will commence in 2015. See more about the plans for the German railway works for the Fehmarnbelt project on Deutsche Bahn's website: [www.deutschebahn.com](http://www.deutschebahn.com).

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## Railway consultants in place

***Femern A/S has just entered into contracts with three technical consulting groups. All three groups will work on the rail part of the coast-to-coast section of the Fehmarnbelt Fixed Link.***

Ingenieurbüro Dipl.-Ing. H. Vössing GmbH (Germany) will undertake the railway design and define the interfaces between the German and Danish railway technologies as well as design the connections from the hinterland infrastructure to the existing railway.

Atkins Danmark A/S (Denmark) will develop the railway safety plan and set the norms to be applicable on the basis of legislation in Germany, Denmark and the EU. Atkins will also help Femern A/S with the preparation of the application for approval of the project by the German and Danish authorities.

The Rambøll-Arup-Vectura joint venture (Denmark, UK, Sweden) will undertake the railway capacity analysis on the line between Ringsted and Lübeck. The consultant's work will include preparing a proposal for train schedules and identifying bottlenecks along the route.

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## Experience and renewal in the Fehmarnbelt

***The countdown has begun. In nine years' time the fixed link across the Fehmarnbelt must be ready. Experienced planners and engineers in Femern A/S have been tasked with completing the project on time.***

Femern A/S is currently focusing on the complex planning of the project. The first major milestone for the company will be in 2012, by which time all the permissions from authorities must have been obtained in order to meet the goal of opening the link in 2018.

The planning includes investigation of both a bridge and a tunnel. Only once all evaluations have been completed in 2012 can the final technical solution and layout be fixed. ►

Work with the approval process in both Germany and Denmark up until now has shown that Project 2012 both builds on experience and involves new challenges.



*Project Director  
Claus Dynesen*

The new challenges include the regulations in the two countries not being identical and that the authorities each organise their work in their own way. And also that the authorities in the two countries do not know their counterparts in the other country - and so the staff handling the cases need time to talk and get to know each other.

Similar issues came up in the 1990s during work on the Øresund fixed link between Denmark and Sweden. Femern A/S is therefore using the experiences gained back then, and a number of experienced employees from the Øresund project are involved in planning the Fehmarnbelt Fixed Link.

"Even though there are many similarities between the Øresund and the Fehmarnbelt project, there are also differences where we have to find completely new solutions. This applies both to the planning work currently underway and the forthcoming construction work. So we already have some German staff employed in the company, and we are working closely with German consultants in order to achieve the smoothest and most correct process with the authorities in Germany," says Claus Dynesen, Project Director at Femern A/S

For the moment, large parts of the work concern preparing the approval process with the authorities in both Denmark and Germany. Added to that is the planning and design of a tunnel and a bridge in order to be able to decide which of the two respective solutions is most suitable. Femern A/S has three experienced people looking after these tasks.



*Project Director, tunnel  
Steen Lykke*

The Project Director Claus Dynesen is a member of the management group and has the overall responsibility for the environment and authority process. His responsibility includes the necessary environmental examinations and coordination with the relevant authorities. Claus Dynesen has previously been project director for environment and authority affairs for the construction of the Øresund Fixed Link, and has had equivalent tasks with the construction of the Storebælt Fixed Link.

Project Director Steen Lykke is responsible for preparing a proposal for a tunnel. Together with his staff and the external consulting group Rambøll, Arup & TEC, Steen Lykke is responsible for preparing a project proposal for approval by authorities in Denmark and Germany. As well as the design of the immersed tunnel itself, the task also includes design of the access facilities on Lolland and on Fehmarn. Steen Lykke is a civil engineer whose previous positions include being project director for the construction of the immersed tunnel which is part of the Øresund Link, and for the world's deepest immersed tunnel under the Bosphorus Strait in Istanbul. ►



*Project Director, bridge  
Henrik Christensen*

Project Director Henrik Christensen is responsible for preparing a proposal for a bridge over the Fehmarnbelt. Henrik Christensen and his staff are receiving help from the COWI-Obermeyer consulting group to prepare a project proposal to be approved by the authorities in Denmark and Germany. As well as the design of the actual bridge, the task also includes design of the access facilities on Lolland and on Fehmarn. Henrik Christensen is a civil engineer and has a diploma in business administration. His previous positions include being Design Manager for the Øresund Bridge and Technical Director for the Citytunnel in Malmö.