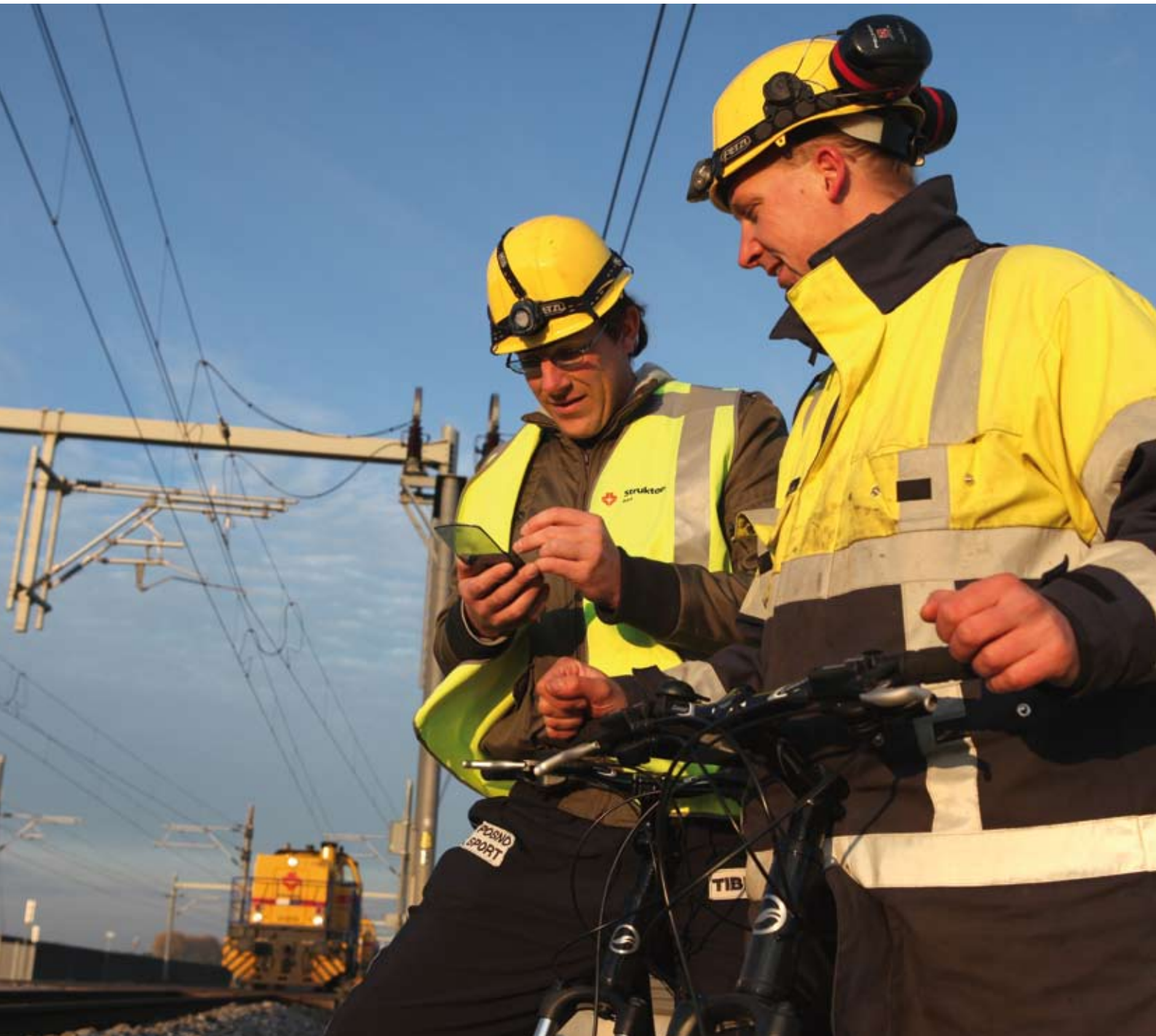


About

# ***Railways***

# 13

February 2010



**Strukton**  
Rail

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*Robert Röder, CEO of Strukton Rail's Swedish branch, has worked in the rail industry all his life - first doing tough jobs out on the tracks, then working as a rail consultant and finally in various managerial roles. Since 2000, Robert has led the company that was hived off from Storstockholms Lokaltrafik (SL) and later acquired by Strukton.*

*Today, the Scandinavian branches of Strukton are two of the more successful businesses within the group.*

Robert Röder:

# “A time of major changes”

**“The rail industry is an exciting and modern industry to be involved in. Modern because the railway meets the demand for efficient and energy-saving transport solutions that are vital for our future. Exciting because the heavily traditional rail industry is now facing major changes, both in cultural and in economic respect.**”

The economic downturn has put many countries' economies under pressure and this in turn affects the amount of projects in the market. Above all, there is high pressure on prices, which unfortunately is also having a negative impact on quality standards.

This is especially the case in the Netherlands. The changes in that country have come more quickly than we had foreseen. Maintenance contracts are put to tender at a higher speed than expected. Prices are extremely low. This has forced Strukton Rail to take sharp measures including the reduction of 350 jobs in the Netherlands. Other contractors including Spitzke and VolkerRail have taken similar measures.

The industry has successfully invested in the reduction of repair times and breakdowns over the past five years. But now we have reason to be highly concerned for quality, since the price seems to be the only factor to decide who wins a contract. We believe that the new market order implies that the railway manager should watch over quality in addition to price and at the same time make sure that all contractors are treated and judged in the same way.

The Scandinavian market is a quite different example of a free market. When Strukton became the majority shareholder of Svensk Banproduktion in 2003, the Swedish railway manager lost its monopoly position, where the incentive was not always sufficiently strong to drive forward efficient progress. Competition in Sweden rapidly became tougher between 2003 and 2006 and we learned the hard way by losing contracts. This led to necessary adaptations and changes, and we were forced to improve in terms of both planning and implementation. Looking back, we can conclude that this pressure has made us stronger and has been good for the customer. Today we have a strong position in the deregulated Swedish rail market.

In Norway we expect growth in the coming years, due to the political will to increase the investments in rail renewal and new building. We have succeeded in placing the Strukton name in the minds of important decision makers in Norway - and are expecting a good and mutual benefit where Strukton resources will be a part of the renewal of Norwegian infrastructure.

In Denmark we have entered a joint venture with the Danish company Aarsleff Rail A/S. This enables us to learn from and work together with a well-reputed firm with long experience in the Danish rail market.

#### **HARMONIZATION OF RAILWAY LEGISLATION**

Our key customers in Scandinavia - the Swedish and Norwegian railway managers and Storstockholms Lokaltrafik (SL) - have developed into more professional customers. Concerns about the introduction of competition-based railway maintenance have proven unfounded. Track maintenance, laying and upgrading has become more efficient and provides better value for taxpayers through competition. The scare tactics - about Thatcher's 1980s deregulation in the UK and the accidents that happened there - have come to nothing. On the contrary, the efficiency gains have facilitated an increased focus on the railway's safety, quality and environment. From this we may learn that a fruitful cost-orientated approach in maintenance cannot go without undiminished quality awareness. Having seen and experienced the benefits, we plead for harmonization of railway legislation and the opening up of a free market not only for goods and passenger transport, but also for services and maintenance.

The differences between the European countries are still considerable, although the railways are being maintained in more or less the same way in the countries where we operate. It is highly desirable that we achieve greater similarities in the short term, not just

technically but also in terms of planning and procurement of projects and maintenance. The faster we have an infrastructure that is borderless, the faster customers will be able to make better use of resources, increased competition, better prices and 'more rail for money'.

The long-term objective of the European Commission is 'to create a single European railway system with open markets for both train operation and the supply of goods and services'. The European rail package is a good thing and slowly creating one railway in Europe. We would be proud to contribute to an international rather than national approach of railways. This requires that communication, tender documents and contracts will be available in more languages than the local. And it seems no more than logical that communication between operational management and track work should be done in English, like in aviation business. More importantly, this will require a uniform certification of rail construction machinery. We need to swiftly move towards a system of mutual acceptance. One inspector, one inspection and one machine should be applicable in all European nations.

The cherished old national railways are part of a dream gone by and no longer fit into the Europe that we help building right now. I started this article stating that the rail industry is a 'modern' industry. That should also apply to the politicians' attitude to how an efficient infrastructure should be run. The Swedish deregulation model is a good way to go, with us and our competitors having shown over the past six years or more that maintenance procured through competition can be good maintenance.”

# “The icing on the cake”

## Frans Baarslag enjoys embarking on a mission abroad.

In 2007, Strukton Rail Equipment earned only 1% of its turnover from deploying staff and equipment in more than one country. The figure had already risen to 22% the year after, while it amounted to around 30% in 2009. And it would appear that there is still plenty more international expansion to come. Furthermore, increasing the deployment of equipment on an international scale implies that steadily rising numbers of Strukton Rail staff are regularly employed overseas, too. One of the employees in question is Frans Baarslag, aged 54, a mechanic/road maintenance engineer by trade, and the team leader on the Unimat 4 for several years now. He easily spends around eight weeks a year working abroad, which he considers “the icing on the cake”.

It's certainly not paradise, as the web log of Frans' trips shows. In June 2009, he was based in France and, as he wrote: "... a fortnight of continuously working twelve-hour shifts at night... almost no time to enjoy a proper meal... furthermore, I think they must've dropped the railway line out of a plane, given the amount of lift and realignment required." He nevertheless concluded: "It was an absolutely amazing experience."

Frans Baarslag's overseas career accurately reflects the internationalisation of Strukton Rail as it were. The fact is the firm had hardly concluded its takeover of a Belgian business, when he was already approached to operate the Unimat 6 across the Netherlands' southern border. He viewed it as 'a challenge' and promptly spent almost the next four years commuting back and forth from the Netherlands to Belgium daily.

When it finally drew to a close - the Belgians eventually acquired the skill to take care of matters themselves, while his services as a team leader were urgently required back in the Netherlands - Frans was sad to leave. "Things are a lot more easy-going down there. And they do their work thoroughly, with a great deal of discipline. If anything goes amiss, they're the first to admit it openly. And it's that sort of frank working atmosphere that I sometimes miss." His spell 'ashore' in the Netherlands did not last long, however, as he was approached to work abroad again within the year, due to the acquisitions that Strukton had made in Sweden and Norway.

### MUTUAL UNDERSTANDING

Trips to Scandinavia are naturally an entirely different kettle of fish to popping back and forth to Belgium.



Didn't he feel rather apprehensive? "No, not in the slightest. We had seen it coming for a few years by that time. Given the rate of Strukton's international expansion, it was just a matter of time before we would be popped the question. And although my contract does not oblige me in any way to work abroad, you can hardly refuse if you want to continue to earn a decent living." Not that Frans Baarslag ever considered refusing, as he always fancied the idea of 'adventure' as he refers to working abroad. "I'm finally getting the chance to do things that were previously just a slumbering passion."

The only real concern that Frans had was the language barrier. "The language of communication there is English, which I understand quite well, but I don't speak it fluently. I was rather worried about that at first. In practice, however, it's not really a huge problem. See, it's not those fellows' mother tongue either; we are all railway guys, technicians. You end up understanding one another sooner or later, that's one thing I have noticed."

### IRREGULAR WORKING HOURS

Frans naturally had to discuss the matter at home first, and his wife had insisted: "If you really want to go, then I won't hold you back. As long as it doesn't get out of hand."

Frans: "What she meant was that she didn't want me spending lengthy periods abroad. I had been away for three weeks once, which I considered really too long. Two weeks is just about right, in my wife's mind, too. And my kids? They're already aged twenty and twenty-one, so they're pretty much independent. When I've been abroad for a while, however, they always ask: Where have you been all this time?"

It all sounds very exciting: A fortnight in Norway, Sweden or France. But doesn't he miss sleeping in his own bed? - after all, he could drive home again every day when he was working in Belgium, but that's no longer an option when one is further afield. "No, that doesn't bother me, as I could sleep on a washing line." What about the lack of home cooking, though? "I have no fear of strange food. I'll give anything a go," he reminisces, watering at the mouth over a Swedish dish with the peculiar name of '*plankje*', which means 'board' in Dutch. "And it did indeed turn out to be a wooden board adorned with a prime piece of meat, surrounded by mashed potatoes and vegetables. Heavenly!" Nor has his social life really suffered as a result of regular absences, according to

Frans. "Irregular working hours are simply part and parcel of driving a tamping machine, regardless of whether you are working in the Netherlands or abroad. My trips abroad haven't changed my circumstances in that respect at all."

### THE HEART OF THE FOREST

Frans admits he is 'largely positive', reflecting on the jobs he worked on in Scandinavia and France. "You learn loads along the way, not so much in terms of the work involved, because that's largely the same wherever you go. It's more the fact that you get to meet different people and experience different cultures. And you have to work more independently than you would back in the Netherlands. It's only logical; if you encounter a hitch when working abroad, then you can't simply lift the phone and ask for a replacement crew, to avoid suffering serious delays. What I myself particularly enjoy, is working in an entirely different environment. Everywhere you go, the surroundings are different every time." His fondest memories are of the time that he worked on the Bothnia Line, in the north of Sweden. "We were working out in the heart of the forest, with not another soul for miles around. I was really in

my element working there, as it's so tranquil." And did he come across much wildlife? "No, although I kept my eyes well peeled, I failed to spot a single eland."

Frans nevertheless insists that this sort of foreign mission is not everyone's cup of tea. "It's certainly not suitable for those with an *eight to five* attitude. That simply doesn't work. As I already mentioned, once you embark on a job, you have to continue until it's completed. You can't call in another team to bail you out whenever the going gets tough." You also have to be able to improvise, which many would consider an unwelcome interruption of their daily routine. Not Frans, however, as he considers "the unexpected one of life's greatest pleasures." "It really gives me a buzz when they call to say that my services are required immediately, due to some sort of emergency, otherwise the trains simply wouldn't be able to run. When I was in Norway just recently, for instance, a Swedish colleague called to ask if I could pop by the next day... He was only eight hundred kilometres away, after all! It lends the job a certain sense of importance, which I like."

# On two tracks to a new form

**Following the split in 1995, the rail sector in the Netherlands embarked on a course that involved new business relationships and different forms of maintenance contracts. Infrastructure managers ProRail and Keyrail each pursued this course in their own particular way. The consequences for the process contractor are quite considerable. Here's a brief history of previous events.**

First there was the firm known as Nederlandsche Spoorwegen (Dutch Rail), which traditionally managed all rail operations itself; it engaged just a few railway contractors to supply manpower and sleeper grabs. Then in 1995, its territory was split up - in keeping with the European Union's requirements aimed at unambiguity and transparency - into operation, management and maintenance. Nederlandsche Spoorwegen was subsequently renamed NS and retained responsibility for train services only. The rail infrastructure manager was ultimately registered as ProRail. While rail contractors retained their original names (Strukton Rail, VolkerRail and BAM Rail), the three proceeded for the time being - though with sharply increased amounts of equipment and workforces - to perform systematic track maintenance. They became what are known as process contractors. From that moment on, nothing was to remain the same, nor could anything be taken for granted.

The difficulty lay in lending form and structure to the changing relationship between the infrastructure manager and process contractor, from the point of daily relations to contracts spanning several years. Everything had to be done differently, that much was clear. It had to become more efficient and businesslike, though at the same time improved and cheaper. The parties involved were to be given a decade in which to develop a system that was sufficiently mature to call for tenders on the open market, where qualified contractors would all become one another's rivals. It appeared that everyone more or less agreed on the course of action to be taken. One had to move away from input contracts, which focused on listed compulsory operations and prescribed

materials. The manager would first have to set standards and aim for output. The process contractors could then show what sort of performance they were capable of, while the means and materials employed would become secondary issues.

## **A COUNTERPRODUCTIVE TREND**

The course chosen proved to be far from smooth. Change in itself is not really conducive to a sense of security, and therefore certainly not in a sector which is simply steeped in safety awareness. In 2008, ProRail put the first two PBMCs, or Performance Based Maintenance Contracts, on the market for a term of five years. A new process contractor, ASSET Rail, waltzed off with the first of them. Strukton Rail secured the second, a concession for some 300 kilometres of track with a similar number of points in the Venlo and Eindhoven regions. The third was awarded to VolkerRail.

And yes, those contracts were focused more on quality and evidence than had previously been the case. And provided it could vouch for the availability of the track, the contractor would be afforded greater freedom in performing its work. Objective achieved? Yes and no. Erland Tegelberg has his reservations. He is senior managing consultant at Strukton Rail Consult. Since he left the field of civil projects to join Strukton in 1998, he has been seated at the same table with the infrastructure manager ProRail whenever the development of model contracts was discussed. "ProRail's PBMCs are subject to a strict contractual regime, involving all sorts of penalty clauses. They contain disincentives, instead of encouraging any form of innovation. You can offer them the earth - comprising anything from a maintenance management team to a video

inspection train - but you won't be paid a single cent more, because the customer insists that it is not an essential requirement. There's a counterproductive trend currently evident, which is drawing attention away from absolutely essential developments. I am referring primarily to developments that offer greater transparency, such as video inspection trains and the extended use of information systems for maintenance engineering and management."

## **THE NEW TESTING GROUND**

Things could be done differently and quicker, too. This became apparent in January 2007, when Keyrail was designated the operator and manager of the Betuweroute, the goods line from the Port of Rotterdam to the German border. However, as Erland Tegelberg puts it, the "parties first had to break with a 160-year railway tradition." And this proved surprisingly successful. Keyrail, a joint venture set up by ProRail and the Port authorities of Amsterdam and Rotterdam, opted for an almost clean slate. It began by holding consultations with the market, instead of simply waving a maintenance contract around. How would we prefer to tackle maintenance if we were hypothetically given the opportunity to challenge ProRail regulations and need not back down on the issue of joint capacity management? This approach led to a

tender, which implicitly called for some form of alliance, a bid for a three-year period and a further two-year option, in which the manager and the process contractor would equally split the cost savings realised. Strukton Rail emerged as the winner of the European tender, and was given the opportunity to set up a hitherto unique partnership in the field of maintenance, commencing from January 2008. Within just one year, a new testing ground had been created in a parallel world.

At the time (late 2007), Contract Manager Arjen van Leuven outlined the primary characteristics of the contract as follows: "The ProRail maintenance contracts are still of a primarily quantitative nature, which imply that one has to issue notice of routine maintenance weeks or even months in advance. This contract is more flexible. Keyrail reports the nature and quantity of the inspection runs to be performed, but we are otherwise free to decide how we maintain at least the established 'base level' of physical quality on the line. We speak of condition-based maintenance - the form of maintenance we apply is up to us. We also treat train paths differently. We reserve capacity for maintenance operations directly through Keyrail's rail traffic control centre. Keyrail therefore schedules our work in exactly the same way that it schedules trains." Erland Tegelberg has no reservations

whatsoever concerning this type of contract so far: "This contract bears testimony to the fact that we need one another, that we each have our own particular knowledge and expertise, and that we perform better as a coherent whole than would the sum of our parts. This contract places the carrier, the train, in paramount position."

Regardless of whether it's ProRail or Keyrail, the consequences of both forms of contract are extremely far-reaching for maintenance contractor Strukton Rail. The free market entails a sense of uncertainty. The regional structure of the organisation during the next few years will depend greatly on the number and the locations of the ProRail concessions that Strukton Rail manages to secure. If the marketplace is to continue to flourish, then the manner in which the required quality of service and that ultimately contracted are measured will prove crucial, as well as the means applied to maintain standards on the basis of this data.

The changes in the organisation and the arrangement of the work are even more far-reaching. They are gradually becoming evident on the Betuweroute.





# A blueprint for the future

**Marc Maathuis is in charge of the team 'doing' the Betuweroute. How a different working method is gradually being lent form and content.**

"We have a contract with a growth model in the form of an alliance which, in stark contrast to those concluded with ProRail, defines solely the aspects that are to be inspected and the frequency. All the ensuing work to ensure the track complies with a certain standard, the base level, has to be included in the price. This is entirely different to anything we've ever done before. We now carry out condition-based maintenance. One therefore has to examine the status of an object, then decide what needs to be done to keep it up and running.

And when you put it like that, it sounds pretty straightforward, as though it shouldn't really be a problem. But it does mean that you have to reshuffle your organisation. You no longer describe what you are going to do, but rather have to carry out analysis. You inspect and measure and process data, which is then subjected to analysis, on the basis of which the work to be executed is determined. This process was entirely new to us. We didn't know at the time how we were going to tackle it."

Marc Maathuis is a railwayman - heart and soul. He originally joined Strukton as a young manager in the tram sector, and has gradually built a solid career with the firm. Marc and his team are responsible for management of the entire Betuweroute. For almost two years now, they have endeavoured to develop an organisation capable of fulfilling a maintenance contract that is unparalleled anywhere in Europe. It sounds simple, Marc Maathuis admits, although actually doing so is a different matter. "After all, a lot of the people involved had been accustomed to a particular working method for as long as they could remember, then all of a sudden they were expected to do things differently. Take all the railway safety and occupational safety legislation, the vast quantities of work & product instructions, the amendment of reporting formats. These bring about considerable changes in both the level of cooperation with one another and the management of an organisation. Managing these changes remains our greatest challenge to this day."

**NOTHING STANDARD ANY LONGER**

What they had been accustomed to doing all those years was planning and execution. What they now do is engineering. Figuring things out, planning, execution, verification - and all within a cycle of continuous improvement. Marc Maathuis: "What is truly different is that we now have an actual Maintenance Engineering department which has assumed a central position in the process. We have a team of nine, which may seem like a lot for a branch of this size. The data from all

inspections is accumulated here; this serves as the basis for our operational planning. We do not perform standard work any longer, which means no maintenance on a set of points that is still in good shape. The maintenance engineers feed the production managers work. This needs to be carried out, and please send me the control data once it has been, so that I can assess whether you've done enough. Another essential aspect is that we differentiate between production and inspection within this closed circuit. We have engineers who do the work and others who take measurements."

Perhaps an even bigger difference - and a good indication of mutual relations - is the fact that we have set up a joint workplace safety instruction office with Keyrail. The people at this office draw up workplace safety instructions for every occasion that work is to be performed on the track. In the parallel world of ProRail, this is a facility where one has to get in line early. "And that," Marc Maathuis feels, "is a huge step forward." It is

no longer a case of proceeding upwards through the classic hierarchy: Justifying and requesting a temporary decommissioning; the manager who checks whether there are other requests and if it would be convenient or not - which has a disastrous effect on sound planning. "The fact that we have joint operations enables us to swiftly anticipate circumstances. The throughput time is reduced; one can link up quicker and get to work sooner. This new setup enables broader consultation. One can speak directly to the carriers and rail traffic control. These are real points of progress in which one recognises the characteristic differences between Keyrail and ProRail. Keyrail says: We operate trains and we also have to perform track maintenance. ProRail says: We maintain track better than anyone else in Europe. Keyrail's core business is to enable trains to run. Therefore, if we can prove that certain action on our part will enable Keyrail to accommodate more trains, then it will support such action. This is a positive change: The fact that we cooperate." This different way of



working also created new jobs: "We were joined by creative minds from the field of ICT, although they do have a background in management. Our Head of Maintenance Engineering was previously employed in the automotive industry. This provides new impetus. People have the opportunity to develop their own jobs. For instance, we have one maintenance engineer who joined us from the tobacco industry. He worked in a factory full of machinery. These chaps have heightened insight into the production of machinery. They are trained to analyse the processes of degradation and wear, then seek areas for improvement on the basis of objective data rather than gut feelings. The classic railwayman is too often inclined to try and keep things running - oh, it will still do a turn - while a maintenance engineer will certainly not do so. The latter readily admits: If my reading is 1452, while it is supposed to be lower than 1450, then there is something wrong and I have to find a way of addressing the balance. There's no point in thinking: 1452, that's passable. Although that is exactly what an experienced railwayman would do. This is simply no longer acceptable when one operates on the basis of standard values. And therefore, in every respect - mental, technical and organisational - we are

changing. The main difference from the way things were in the old days, I think, is that the level of transparency has become much greater. And this is essential, too, even though some of us may still be struggling to get used to it. This type of contract simply demands that we adopt an analytical, transparent and disciplined stance."

#### CUTTING COSTS

The answer to the question whether Marc Maathuis and his team have been able to benefit from references from abroad is an ambiguous one: Yes and no. Their foreign colleagues are currently coming to the Netherlands to discover the significance of maintenance engineering. However, in certain subsectors - and particularly in the field of planning and execution - one can certainly benefit greatly from being an international organisation.

"We have established that our Swedish colleagues operate more effectively and efficiently in certain areas. We also learned that they carry out a lot more work planning than we do. Bit by bit, the dissemination of knowledge has gained a foothold, along the lines of the 'smartest in the class' principle. The experience we have gained on the Betuweroute also proves useful in our other

fields of maintenance, in the Netherlands and in Scandinavia and vice versa.'

The question remains whether the contractually determined working approach and alliance relations applicable on the Betuweroute will have any effect whatsoever beyond the boundaries of this line. "ProRail initially took a rather sceptical view of the approach," Marc Maathuis answered. "However, its interest has been attracted. And I trust that the Keyrail model will gain its admiration within the next two years. ProRail is engaging new employees who are proponents of change. Furthermore, our joint approach has enabled us to cut costs. One can therefore spend an appropriate amount on maintenance, linked to the desired quality standard. One is no longer pouring money down the drain, is the way I would put it. Keyrail challenges you: Ensure that we can run as many trains as possible, be innovative, be creative. Make us a proposal - and if you get things right, then you will be rewarded. Really, if you wish to reach a stage where you have the highest possible rail infrastructure quality at the lowest possible cost to the community, then the Keyrail model is the blueprint for the future."



## A flexible lightweight

**It had hardly touched base in the Netherlands before having to head off to the frozen**

**North - the 08-275/4 ZW-Y universal tamping machine, otherwise known as 'the Beaver'.**

There was plenty of work on light rail projects at that time in Bergen and Stavanger, Norway, exactly the spot chosen for it by the Strukton Rail Equipment selection committee after at least a year's careful deliberation. Only once the snow and icy winter air enveloped Scandinavia, making any further work impossible, did the machine return to the Netherlands. Back to the market for which it was originally intended.

The arrival of the Beaver was preceded by a gradual process of market research and decision-making, supported by opinions expressed by colleagues working in Strukton Rail's home base countries. A process like this takes time. Although a relative small fry in its class, the Beaver is expensive, has to last for many years and you can't just pick one up any old time at a DIY store. A new lightweight tamping machine emerged back in 2005, initially as a necessary replacement for the old. "Since then, I've been speaking to my colleagues in the countries where we're based," explains equipment engineer Barend Ton. "The Swedes had just taken over a lightweight tamping machine and wanted another. The Belgians and Germans were also interested. In Belgium, Public Transport Company 'De Lijn' operates the tramlines along the North Sea coastline and the tracks are metre gauge. And in the vicinity of the German town of Kassel there is a great deal of track ideally suited to being worked on by a flexible lightweight. We took this into account in drawing up the specifications for Plasser & Theurer." Thus ordered in 2007 and delivered in 2009: a narrow gauge universal tamping machine capable of working on all manner of light rail tracks and tramlines,

whether Vignoles rail, grooved rail or conductor rail. One that does not produce too much axle pressure and is not too big for tight curves. And, where necessary, can be fitted with a set of bogies to enable it to work on metre gauge tracks. Flexible in a different respect, too, in that it features four hydraulic lifting cylinders and a turntable which can place it on a truck with a low loader, enabling it to be transported easily from job to job by rail or road. And if it arrives by road and cannot position itself on the tracks independently, it is light enough for a crane to hoist it onto the tracks.

The Beaver carried out its first serious tamping job for city transport company RET at the Waalhaven harbour in the Port of Rotterdam. Barend Ton: "That was probably the narrowest conductor rail profile in Europe and it went off well." Directly afterwards, the Beaver travelled by road to Stavanger to be used in constructing 14.5 kilometres of dual light rail track. At the same time, Bybanen enquired at the machine's producer Plasser in Bergen, Norway - 160 kilometres further north - if they knew of a narrow gauge tamping machine for their ambitious light rail project. Talk about coincidence... and so it came to pass that the Beaver spent summer and autumn working in Norway.

The machine returned to the Netherlands in October 2009, ready and more than run-in for use by major regional transporters operating in and around the big cities in the Netherlands. But other countries continue to call. The Beaver will make its debut in Belgium early 2010, where a couple of nights of work on gauge are waiting on the metro network of the Flemish transport company De Lijn.



Inspection on the bicycle, PDAs near at hand  
Colin Baldé (I) and Kor van der Zwan

# A demanding customer

## A meeting with Odd Erik

### Berg, Maintenance

### Director at Norway's

### Railway Manager

### Jernbaneverket. "All

### players need some degree

### of predictability."

#### *What is your view on privatisation - does it give us more railway for money?*

"Jernbaneverket has a strategy based on retaining a certain amount of in-house production to cover the daily tasks on the one hand and outsourcing services to other players on the other. Currently, we are totally dependent on external sources if we want to meet all our obligations.

We have bought in capacity since we were established as a separate company in the early nineties. Perhaps the biggest difference between in-house production and purchasing external services is how quickly we can get projects up and running. We have noticed this particularly in 2009, when we received increased funding through the fiscal stimulus package. It is clearly a challenge to carry out these processes properly and get the work done smoothly. It takes more time to get resources allocated to projects, compared with when we had more of our own production capacity.

The 2009 budget was sufficient owing to the fiscal stimulus package. The National Transport Plan of the Norwegian government promises to provide us with more money for the coming ten years. We aim to stabilise our operations around the projects in this plan and expect that we will be able to carry out some decent work on a number of sections. The tasks set will be feasible as long as we receive funding in the ordinary budgets as well, and not just the additional fiscal stimulus packages. It will be easier to plan for the long-term future now that we have the National Transport Plan to work to. This plan contains a number of large-scale projects that require a long-term approach."

#### *What is your view on the external players as candidates for maintenance?*

"Strukton Rail is an example of an external contractor who has been involved in laying new track and also provides ongoing services in the area of preventive maintenance and renewal. Jernbaneverket has reviewed operational contracts relating to specific sections, and has chosen not to proceed with them. The age of our resources makes such a division of responsibility extremely difficult. We have decided to carry on with the system we have already, where we carry out core tasks using our own machinery and outsource additional services."

#### *How do you assess external players when outsourcing services?*

"We have been buying in services from external players for many years, so this is nothing new for us. We have been using different contractors for a long time, including Strukton Rail for track realignment. It is important for us to have good long-term relations in the market so that we can work together to achieve the best possible results within the agreed areas of activity. We rely heavily on the mutual respect that we have as a customer and supplier. It is difficult to carry out major jobs without a solid company to rely on. The new and smaller companies prefer the position of subcontractors to the big players."



#### *Are the tendering rules generating an influx of new international players?*

"When it comes to maintenance contracts, we use a prequalification database, TransQ, which covers both Norwegian and international suppliers. The suppliers can prequalify for jobs in various categories. We therefore don't issue open invitations to tender, which simplifies the process both for us and for them."

#### *Strukton has become a relatively big player as a result of the consolidation of specialised railway contractors. Several local Norwegian contractors have disappeared as a result. What is your view on this?*

"Our suppliers must have a certain strength in order to be able to take part in large-scale projects. These projects generally bring together different specialist areas, which makes this kind of consolidation only natural. At the same time, we believe that it is important for healthy competition that different companies compete for projects, rather than just a few large candidates."

#### *How important is interdisciplinary expertise?*

"We have been carrying out highly complex maintenance work, particularly in the Oslo area. Another example is the track realignment jobs that involve working on points and therefore require signalling expertise. We want activities that are closely linked to be included in one contract, so that the contractor can carry out the entire

coordination of resources. There is a major lack of capacity within some specialist areas, such as signalling. It is therefore an advantage when the contractors are able to provide the personnel and machines to meet contractual obligations and plans."

#### *Strukton has access to a large fleet of advanced machines - does Jernbaneverket see this as a strength?*

"Yes, because it provides access to resources and flexibility. However, Norwegian rules require that each individual machine is permitted, so it can be difficult to bring these in on a tight schedule. But it is good to know that machines are available if anything unforeseen happens. A machine may break down or we may need to provide machines now and then to help on individual projects. We already have the example of Strukton bringing in tamping machines at short notice because we needed more capacity."

#### *Is it important for you that Strukton is part of a large international organisation?*

"We deal with the Norwegian part of Strukton Rail, but it is good to know that they are backed up by a major international player, with access to machines and other specialist expertise. Any transfer of knowledge, either technical or organisational, that benefits us as a customer is a good thing. Strukton may come up with contributions and solutions based on experience of similar projects in other countries, and I always find that type of discussion interesting!"

*Do you feel responsible for expertise and resources, or should that responsibility lie with the contractor?*

"We clearly have our own responsibility in that respect. We recruited 58 apprentices in 2009 and realise that we should increase the total capacity of specialist expertise in railway engineering in our own company. We are concerned that we will find ourselves competing for resources - which would increase costs - if we don't help to increase capacity and develop specialist knowledge among employees. It will always be the customer who will pay the bill in the end."

*Do you see it as more cost-effective to maintain current track or to lay new track?*

"The railway network in Norway is old. The pros and cons of new track versus maintaining the old infrastructure are based on whether there is a need to reduce journey times or increase service frequencies. That cannot be done through maintenance or rehabilitation of the existing network. The only option to increase service frequencies or reduce journey times is to lay new track. Increased capacity requires new infrastructure. Our priorities in terms of new infrastructure are guided to a large extent by data such as traffic patterns and statistics on infrastructure-related delays."

*The current boost in work is partly due to the financial crisis. What does the future look like in the long term?*

"The work in 2009 was linked to the fiscal stimulus package, but the National Transport Plan is also providing a boost in terms of renewal and investment that is entirely separate from the financial crisis. The National Transport Plan comes into force from 2010. One of the challenges we face is our dependence on the annual allocation of funds."

*Do these signals provide grounds for optimism about the future of the railways?*

"The fiscal stimulus package gave us a huge boost in 2009. Discussions about the



National Transport Plan have been extremely encouraging and I think we're facing a considerable increase in railway investment. Politicians now seem to appreciate the need for a functioning railway system, both in terms of building modern new infrastructure and maintaining the existing network. All parties recognize the need around the major cities, but opinions are more divided about the railway lines between towns and cities and whether we should invest in railways or roads."

*We sense a certain amount of optimism within Jernbaneverket about funding for new track and upgrading the existing network.*

"We feel that our arguments were well considered in the process of drawing up the National Transport Plan. This plan provides a good framework for renewal and maintenance. We have also received extra funding to tackle problems in the Oslo area. The coming years are going to be exciting! All players need some degree of predictability. It is important to know what we are going to do, whether we will be able to really upgrade major sections of track or just address the worst bottlenecks. This is one of the challenges we were faced with in the Oslo area, where we have carried out a great deal

of 'patching up' with limited resources and difficult track access. Because of the problems there, we have now received funds to modernise the Lysaker-Etterstad line and bring this up to modern standards. This will enable us to take away faults and ensure that trains will be able to run in time. We now have to apply the same approach to other stretches around Oslo, implementing the right measures in the right order and so getting as much as possible out of our investment. Predictability is yet more important for contractors than it is for us. They need to know what kinds of services will be required so that they can adapt their organisation accordingly, ensuring that they have the right staff and machines available. Strukton will choose to allocate machines to other countries if there are no firm projects here."

*Any final comments?*

"We are a demanding customer, and we intend to remain so. Our technical discussions with Strukton have been fruitful and enable both parties to improve, which is a great thing. As with all our other suppliers, there is room for Strukton to improve, but that is also true for ourselves!"

# Business in India

**A global train and locomotive market is now accessible to Strukton Rolling Stock's drive, on-board electricity supply and information systems.**

Strukton Rolling Stock has found a business cooperation association in Bharat Heavy Electricals Limited (BHEL), Delhi, offering scope for expansion. At the start of 2009, a third framework agreement was concluded by both parties. This relates to the supply of a traction drive system, on-board electricity supply system and central control computer for electrical locomotives, which are to be built in the Netherlands, as well as sets of parts and modules for which the final assembly and testing of the complete equipments will be done by BHEL as well as the delivery of a limited quantity of materials which will be fully assembled and tested by BHEL. In December 2007, BHEL and Strukton closed similar agreements relating to the provision of systems for electric and diesel-electric trains. Knowledge transfer will be an important part of the long-term cooperation.

With a workforce of over 40,000 and a turnover of some six billion euros in 2008, BHEL is one of India's *Navratnas*, i.e. India's Industrial Pride, being one of the largest industrial crown jewels. Most of its activities focus on Power Plants - from thermal to hydro and electrical systems for trains and locomotives. BHEL's principal customer in the transport sector is Indian Railways, which falls under the Indian Ministry

of Railways. Indian Railways operates one of the world's biggest and busiest rail networks. It measures around 65,000 kilometres in length and accommodates 15,000 trains daily, half of which are passenger trains, carrying some fourteen million passengers a day.

The phased distribution of knowledge, including software and listings is of prime importance to the cooperation between BHEL and Strukton. Strukton Rolling Stock provides the Indian engineers with the necessary information to be able to independently assemble, test and maintain the system and its components during the full life cycle of the equipments. BHEL has decided to further increase its market share in the rail sector. Strukton would like to extend its best support in this objective of BHEL.

The developments taking place in India are seamlessly aligned with Strukton Rolling Stock's growth strategy. Recession or not, the company aims to double its annual turnover within the next three to four years. Dutch expertise is also a sought after commodity for well-known transport organisations and carriage manufacturers in Europe, South Africa, Asia, the United States and South America.



# At the centre of theory and practice

**Strukton Rail Consult must become more businesslike, extrovert, commercially oriented and international. This is a step-by-step process that will take several years.**

**Jens Otto Daugaard sets course for the future.**

Jens Otto Daugaard, civil engineer and economist by trade, had just completed a five-year stint as international director and senior vice president at the Danish Railways (DSB) when he was offered a job by Strukton. At DSB, he had been working on DSB's expansion; international bidding for rail concessions in Europe.

Some interviews later and he stood before choosing between Banverket in Sweden and Strukton Rail Consult. He opted for the latter. "What convinced me was that it was a truly international job." Then came the next call. Soon after that, he became the new man at the helm of Strukton Rail Consult: "An exiting jump." "I have a technical and commercial background. Here, I encountered advanced theoretical knowledge combined with extensive operational practice, and several products with great potential. I could see that there was a market for this."

#### **What was your first impression?**

"There is a vast difference in approach to the 'softer issues' or cultural components, between Strukton Rail Consult and my previous employer. The culture here differs from the culture in Denmark. People say we are similar, but we are not as consensus-oriented as the Dutch. Second, I was accustomed to working in an externally oriented and particularly customer-centric environment. At Strukton, the people are traditionally more inward looking. We are accustomed to getting assignments from internal sources, the regional companies within Strukton Rail and Strukton Systems and Strukton Rolling Stock. In fact, these account for over 90% of our assignments. But we didn't treat one another as customers, so relationships were not always clear. Which means customer orientation was the main difference. But if I look at our people, the ones who carry our technical knowledge, I'm very satisfied because Strukton Rail can draw from a team of excellent technical specialists. International consultancies have a far more extensive customer base and are more forwardly positioned in relation to project lifecycles - they take care of the broader strokes. But when I look at what Strukton Rail Consult does in terms of design and engineering once the assignment is granted, then I see very little difference."

The inward looking, fraternal and somewhat relaxed culture had to become more businesslike. Colleagues for whom half a word was generally enough, and who often only gave half an answer in reply, had to be treated like customers. In the meantime, this fundamental cultural

shift is undergoing lots of tweaking and fine-tuning. Challenge number two is consolidation; number three is customer focus. Central to the latter is the drive to attract more new customers and generate more new turnover. As part of an internal reorganisation of disciplines, the new International Sales, Project Management & Business Development department was established, staffed by people to strengthen Strukton Rail as a whole in achieving growth in the European market. New customers should of course primarily be based in countries where Strukton Rail already enjoys good relations. Jens Otto Daugaard opts for organic growth, building forth on existing relations. And in passing, he points out that the greatest threat facing the organisation is over-ambition. Strukton Rail Consult may never become a broad-stroke consultancy. It would become a dwarf among giants and lose its unique competitive edge.

#### **Are there any examples of expanding relations with external customers?**

"Our current efforts are aimed largely at strengthening our existing relationships with customers and increasing professionalism. We have yet to take the biggest steps at an international level. But if we look at electrical engineering, we can see an example of things to come. It is something we share with Strukton Systems, which acts as the vendor doing business with leading market parties, government bodies, task organisations and international system suppliers. The first cautious steps are visible in consulting and advice. In the Scandinavian countries, but also in France, for example, there is a fair amount of interest in our maintenance management product. What are the good and the bad sides of developments in the Netherlands and what are the potential benefits. Those are the kinds of questions we are asked."

#### **What ambitions play a role? Where will Strukton Rail Consult be in five years time?**

"Let's look ahead to 2013. In 2009, 95% of our work is internal, here in the Netherlands.

By 2013, the ratio at a European level should be 80% internal, 20% external, with nearly a quarter of the turnover originating from outside the Netherlands, predominantly from the Scandinavian countries. Turnover in 2013 should be some 30% higher. By that time, our expertise in maintenance management will have grown to an even higher conceptual level. In so doing, we must however keep a close eye on the scope of our expertise. We need to continue focusing on combining theory and practice, exploiting our uniqueness in the market. We must leave the broad strokes to others. For the time being, there is plenty of room for internal growth. Take maintenance management, for example. We currently devote a lot of time to specific analyses. What the Danes, Norwegians and Swedes ask us is: 'How can I work more efficiently as an infrastructure manager?' We must see things from the perspective of technical infrastructure directors and the priorities in their agendas. System engineering is another example. There too, we would like to operate at a higher level, but once again with both feet firmly rooted in the practical side of operations. We want to be the ones with sufficient advanced theoretical knowledge to facilitate such a translation

into practice. That's precisely what we are good at."

**Strukton Rail Consult has divided its areas of expertise into Rail Technology, Vehicle Technology, Electrical Engineering and System & Software Engineering. Does that sufficiently cover all the areas of expertise?**

"You must constantly ask yourself which competencies you are going to need in the years ahead. We want to excel in signalling (including ERTMS), track, overhead lines, asset management, maintenance management, energy, data capturing and data management. That's a really broad field. In order to achieve this we need a constant inflow of new, fresh knowledge. At all levels of the organisation, there recently has been an influx of operational staff, managers and analysts who originate from the processing industry, petrochemicals and accountancy. But that same trend is evident throughout the international rail arena. After all, the above industries led the way in advancements in planning, process execution, safety and transparency. For years, we have been saying that we can learn a lot from other industries; now we're finally doing so."



# PPP and light rail: A marriage made in heaven

**Partnerships between government bodies and businesses are beginning to gain popularity in the light rail sector albeit slowly. "We are ready for it."**

Cities have become over-congested in the Netherlands - which has led to environmental standards being exceeded - while authorities have had no choice but to put new building projects on hold. But perhaps worst of all, are the evident health problems suffered by thousands of citizens, due to excessive concentrations of fine particles.

It is as clear as the light of day: Society simply has to tackle this problem and, according to the experts, the creation of light rail connections could play a major role in doing so. Although there is no lack of plans, implementation is still excruciatingly slow. And other problems arise wherever the groundwork commences. This has made the authorities in question rather reticent - which is both regrettable and unnecessary in the view of Ronald van Oeveren (Strukton Rail) and Frits Verhees (Strukton Integrale Projecten).

Not only do they consider light rail the solution to an urgent social issue - that of rendering our cities accessible, both swiftly and at acceptable costs, while preventing people from becoming ill as a result - they are also keen public-private partnership (PPP) proponents.

The revival of the demand for light rail connections is closely linked to the expansion of cities other than those within the Randstad conurbation, too. The cities of Groningen, Maastricht, Arnhem, and Nijmegen have all developed their own new residential districts, which offer sufficient transport demand to justify the introduction of light rail connections. Mr Van Oeveren: "Rather ironically, this often amounts to the reintroduction of something that was done away with back in the twentieth century, with the explicit intention of clearing the way for the mode of transport of the future - the car."



Lightrail, newcomer in Orléans (Fr), January 2009

Frits Verhees: "The Netherlands is actually lagging behind countries like France and Germany. Not only are we very car oriented, but we also seem to have something against the concept of PPP. Maybe it's inherent in our culture - viewing the government as an omnipotent force, whose duty it is to protect all of us from the rising water; not a task one would readily relinquish to the free market. The government also developed something of a purchasing culture, which focused largely on securing a good price, rather than aiming for quality."

## **A MARKET WITH CONSIDERABLE POTENTIAL**

A whole series of plans has since been drawn up. The latest of these is for the RijnGouwe Line, from the city of Gouda through the inner city of Leiden to the coast (the first tender is currently being considered). Two tramlines are also to be restored to the city of Groningen (which has expressed a preference for a form of PPP, thanks to the intervention of Ronald Van Oeveren and Frits Verhees). Utrecht is also keen to replace the current bus connection from its Central Station to the Uithof campus with a tram, while the Flemish public transport company De Lijn wants to construct an express tramway connecting the universities of Hasselt and Maastricht. "And that will also be a PPP," Mr Verhees revealed, "as the Belgians are much bolder in this respect than we in the Netherlands." And finally, the topics of political debate in the northern regions of the Netherlands include a new tram link between Zwolle and Kampen and a rail connection between Heerenveen, Drachten and Groningen.

The market offers huge potential, provided the authorities involved adopt an ambitious stance, in Mr Van Oeveren's opinion: "The Netherlands remains rather apprehensive." This despite the fact that it has a few excellent examples of successful light rail projects: RandstadRail, a network surrounding Rotterdam and The Hague, which operates highly favourably; the Utrecht-Nieuwegein express tramway; the underground systems in Rotterdam and Amsterdam; and the express tram to Amstelveen - all are forms of public transport that have persuaded people to leave

their cars at home. The authorities' hesitance is largely due to the considerable risks that such projects entail. They often take longer than scheduled to complete, while also exceeding the provisional budgets. This has much to do with the traditional means of tendering, however, where the authority draws up detailed plans before proceeding to call for market parties to submit their lowest tenders. Mr Verhees: "In that case, the authority bears the financial burden if anything goes wrong, as it drafted the plans, after all. What's more, the selfsame authority carries responsibility for all the work, which can prove extremely taxing given the number of parties involved."

## **TRIED AND TESTED MEANS**

In Frits Verhees and Ronald van Oeveren's view, PPP is a tried and tested means of avoiding such problems. PPP basically implies that the authority restricts itself to its core business of implementing policy and defining preconditions. It is then the market's turn to come up with solutions, which may also include financing the project and ultimately operating the service in question. Mr Verhees: "European research has shown that, in the case of traditional tendering, only 30% of projects are completed on schedule and within the budget, while the figure for PPP is around 80%."

Logical, according to the duo, given that the greatest benefit of PPP is risk management. Mr Van Oeveren explains: "What else would you expect? Given that a consortium of businesses will be held to account for their performance, the participants consider every single detail of what might be expected of them over and over again before actually getting involved in a project. Delayed delivery? That's going to cost your consortium money. Overrun the budget? The banks are not as forgiving as the authorities might be. Given that a PPP generally spans a period of several years, the last thing a business wants is to have to bear the burden of having underestimated the risks involved for the duration of the project." The Netherlands gradually seems to be overcoming its feeling of cold feet when it comes to PPP. And this is partially due to

Strukton Integrale Projecten, which entered the market a decade ago, simply because its parent company was one of the first to realise that there were considerable opportunities for PPPs. This rendered Strukton the market leader in PPPs in both the construction and property markets. Van Oeveren and Verhees expect things to proceed similarly in the light rail market, and both claim "we're ready for it!" The company is already proving this abroad, as Strukton in partnership with NedRailways has submitted a proposal for the light rail project Djurgårdslinjen in the city centre of Stockholm, based on which the Stockholm transport authority decided to expand the project scope. The western and eastern city parts will be linked to the Central Station. Strukton, NedRailways, the Swedish construction company NCC and the Spanish tram builder NAC have formed the international consortium TramTeam Stockholm and will make a bid in the PPP tender that will start in 2010. In Belgium, Strukton has joined forces with Belgian partners to compete in the tender for the Belgian light rail project Spartacus near Hasselt and will participate in the PPP tram projects Pegasus and Brabo in the Antwerp region.

## **MARKET CONSULTATION**

The development of PPP is still basically in the cradle here, Ronald Van Oeveren and Frits Verhees both feel. They spoke of the developments taking place in the Arnhem-Nijmegen urban region in this context, which they jointly refer to as "highly revolutionary." Mr Verhees continues: "Market consultations were held there, in the course of which the private sector was invited to submit an integrated plan for all forms of public transport as well as a vision of the future spatial development of the area. And it is all to take place in the form of a PPP project!" Various Strukton business units are currently working on this project, together with companies within Dutch Railways, specialized in all forms of passenger transport and real estate development. "In the field of PPP," he concludes, "synergy is the name of the game!"

Urban planner Rob van der Bijl:

# “Light rail provides the key to urban accessibility”

**Light rail connections introduced throughout Europe are proving to be a ‘resounding success’. The situation surrounding public-private partnerships (PPPs) for laying and operating these connections, however, is anything but clear. While such forms of cooperation are generally fruitful, not all projects are suitable for PPPs.**

At least, that's what urban planner and engineer Rob van der Bijl believes in relation to his field on the cutting edge of urban development and infrastructure. He enjoys international recognition as an expert on light rail. Rob van der Bijl is the best person to outline light rail in Europe, and how views differ elsewhere on PPP projects.

His personal interest stems from the 1990s, when expansion of the so-called Vinex new build districts commenced in the Netherlands. Van der Bijl: “Many of these are quite substantial and situated on the periphery of the existing town or city, or in fact, beyond the ring road usually. This meant that new access roads had to be built, which led to difficult negotiations between the Ministries of Housing, Spatial Planning & the Environment (VROM) and Transport, Public Works & Water Management (V&W). The latter wasn't willing to provide part of the funding for the necessary tramlines without a struggle, while these are crucial to the success of such districts. This attitude was largely due to the age-old watershed between ‘Traffic and Transport’ on the one hand and ‘Spatial Planning’ on the other. I recognised the problem, and wanted to do something about it. Furthermore, I was doing a lot of work for the city transport company RET in Rotterdam at the time. As an urban planner, I therefore became increasingly interested in the interface between urban planning and traffic and transport.”

This led to the [www.lightrail.nl](http://www.lightrail.nl) platform being set up, as well as numerous research projects for municipalities, provinces and regions. For instance, the city of Groningen asked Van der Bijl to establish whether the city wasn't too small to justify reintroduction of the tram: “I therefore proceeded to study the tram systems in fourteen European cities, and what do you think I found? That many foreign cities of a similar size to Groningen had a tram! In addition, however, the authorities in Groningen wanted to know how to go about it; integrating a tram system to their city's existing infrastructure. I think they feared getting stuck with a train running through the city as it were, complete with a ballast bed and sleepers. I therefore took them to visit Valenciennes, where the designers succeeded in blending the line into its surroundings. The tram runs along the grass verge, allowing one to readily cross the line.”

#### **SOCIAL AND ECONOMIC IMPROVEMENT**

One can also learn a lot from the considerations that persuaded city councils elsewhere to opt for a tram, Van der Bijl thinks: “For example, Orléans city council was keen to carry out something of a facelift on Rue de la République, a major street leading to Place du Martroi, which houses the statue of Joan of Arc on horseback. The general opinion was that Rue de la



République was an historic site, which at the time bore the blemish of an extended strip of asphalt in which buses had created ruts, which turned into puddles whenever it rained. The asphalt has since been cobbled over, while the buses have been replaced by trams with a larger passenger capacity.” Isn't that slightly decadent though, replacing asphalt with cobbles simply for the aesthetic effect? “No, because that's the whole object of the exercise. To bring about social and economic improvement in the city, and light rail has a major role to play in meeting this aim. It often proves a highly cost effective mode of transport for medium-sized cities.”

Trams were originally introduced in the latter half of the nineteenth century. Van der Bijl: “Cities throughout Europe were experiencing vigorous growth at that time, and the trams contributed to making such growth possible.” Much of the urban rail infrastructure subsequently had to make way for the car, between 1930 and 1960. The turning point came in the mid-1970s, and was largely brought about by the deteriorating air quality and quality of life in the cities. The Club of Rome also published its report *The Limits to Growth* in 1972.

Light rail and tram systems have since made a glorious comeback, both in Europe and the United States. France took the lead, closely followed by countries like Spain, Portugal and the UK. Van der Bijl: “The essence of the problem is that cities have expanded into urban regions. Light rail is the ideal means of rendering these regions accessible. It has proven a resounding success wherever it has been introduced.” He adds another French example to the list: Strasbourg. “The city has improved demonstrably. Public transport is much more widely used nowadays. It also led to a decline in traffic congestion, which has had a highly beneficial effect on public space. Furthermore, the quality of the shopping facilities improved, yielding increased turnover and offering superior quality products. This proved in stark contrast to shopkeepers' expectations, as they had feared that curtailing the level of road traffic would be bad for business.”

#### **THE ISSUES OF THE DAY**

This, of course, begs the question: why did it prove such a success in Strasbourg? Van der Bijl promptly answers: “Because they consistently

developed the project, ultimately expanding that single tram line into an entire network. And because the city council remained steadfastly in favour of the plans, refusing to be swayed by the issues of the day. Utrecht also toyed with a plan for a tram in 1995. It was later shelved, however, as have many others in cities throughout Europe during the past decade.”

Less favourable examples of light rail are to be found in the UK, which has much to do with Margaret Thatcher's obdurate market approach. Van der Bijl is adamant: “If you introduce the tram, then it is not a good idea to continue the bus service, forcing the two to compete. A much more commercial approach was adopted in Britain. In many cases, private parties pre-financed the tram there. However, the consequence was that they skimmed a little on the quality when it came to execution of the projects. The stops often proved to be both inappropriately sited and poorly accessible, for the simple reason that the builders benefited from doing everything as cheaply as possible. And how were they able to benefit? Because construction and operation were entirely separate ventures in Britain. Not a recommended approach, in my view.”

He comes across public-private partnerships in all shapes and sizes throughout Europe: “In Germany and Sweden, for example, companies adopt a station, which they proceed to build and operate. This is also a form of PPP.” He nevertheless struggles to think of examples of a PPP set up to construct a light rail connection. “We have little experience in western Europe so far, of consortiums executing tram projects and proceeding to actually operate them. It might prove an attractive option. However, as Groningen is currently in the process of considering precisely this option, there is little we can say about it at the moment.”

Van der Bijl cannot imagine a future without PPPs, however. Their level of success depends very much on the type of project and the organisational/legal form of PPP. Van der Bijl: “Is it the intention to cooperate without any further strings attached, or is it to be a genuine partnership? The latter appears to me to be the only one with any chance of success.”

# Ice-cold work

**...The digging machine has to work hard to crush and break the ice. Bertil Nordström assists with his pick axe, freeing the frozen electrical cables with almost surgical precision...**

It is winter in Älvsbyn, 1,000 km north of Stockholm and not far from the Arctic Circle. Minus 28 degrees one day and plus seven degrees two days later is a reality along the northern trunk line. Today the snow is very light and the temperature just a few degrees below freezing. Normally two out of three errors reported over here relate to the signalling system, because of the cold and sensitivity to temperature changes.

Älvsbyn is the perfect place to witness the breadth of railway maintenance in the winter. The fact that this little place is so representative of tough winter conditions is also supported by the temporary presence of German car manufacturers, here to test vehicles, tyres and electrical components. This far north, just 100 km south of the Arctic Circle, it gets dark at about three in the afternoon.

Around the station site in Älvsbyn lie 7,000 used wooden sleepers. They are waiting for the spring, when they can be re-used for the terminal stations of two deviations from the northern main line on the coast, Skelleftehamn and the port in Piteå. Wooden sleepers have advantages over concrete sleepers at these stations, which mostly receive light goods. Wooden sleepers are, for example, better with regard to derailment thanks to their elasticity. It was also once found that a whole series of concrete sleepers split because they had not been properly prestressed - this was a basic manufacturing fault.



Rail engineer Rolf Andersson trundles his digging machine down to a tunnel opening, but has to wait patiently for two trains to pass before receiving permission to proceed into the tunnel. With two cables fixed to both rails, he short circuits the signal's power so that the signalling system reacts as if a train was standing in the tunnel.

Bertil Nordström has actually retired from the Swedish Rail Administration, but is 'intermittently employed' by the hour to help Rolf Andersson. Halfway into the 800 metre tunnel it looks like a gigantic candle has melted between the tunnel wall and the track. In actual fact a bank of ice has almost breached the rail. The digger's bucket has to work hard to crush and break the ice. Bertil Nordström assists with his pick axe, freeing the frozen electrical cables with almost surgical precision. Although the tunnel wall here is lined so that ice does not form outwards from the wall, water is running inside and outside the ballast bed. There have been plenty of attempts to seal the holes in the tunnel walls, but the water always seems to find its way through new cracks. This clearance work therefore has to be carried out every other day. "The worst problem is the major temperature changes." The water in the

rock freezes when it emerges, forming banks of ice that creep towards the track, increasing the risk of derailment. "It would be better if we had longer periods of consistent cold. Then the water would freeze in the rock and not leak out," explains Nordström.

## **SNOW CLEARANCE**

The snow plough is undergoing a three-day warranty service. Technician Glenn Svensson from Swedish manufacturer SRS Sjölanders is carrying out the inspection. He may need to replace worn parts and overhaul the hydraulics that push out the wings for casting the snow away from the railway embankment, drive the brushes at the front and operate the crane at the back. We follow the northern main line south to Långträsk station, where an older machine is on duty clearing snow from the tracks. The machine can be turned using a plate that is pushed down onto the track and lifts up the whole machine, which can then easily be turned 180 degrees and run in the opposite direction. But it can't do everything. Gustav Lindahl has to clear the switch blades by hand. He is one of the few young people who want to live up here. Gustav is one of the two sons of Christer Lindahl, the signal maintenance manager in Jörn.

Father and son are ready to undertake the exhausting Vasaloppet ski cross country in just over a month.

## **REINDEER**

After heavy snowfalls, reindeer like to move to the roads and cleared railway tracks. "The worst was one time when first 35 reindeer were hit by trains and then another 50 on the same day. It is particularly difficult when it is dark and you have to shoot injured animals or even search for heads in the forest. Reindeer corpses also have to be quickly removed from the track area to prevent rare animals such as wolverines, bears and wolves from being tempted to appear and risk being killed," says Eilert Lindström, who has a gun license and can be called out at any time when a train driver reports hitting reindeer. The Sami herders receive compensation from the state for each identified pair of reindeer ears, which carry a special mark denoting a particular Sami village. However, an increase in the use of fencing has cut the number of reindeer casualties from around 1,000 a year to 200 or so.





Brussels, 9.23 PM

*It is almost night. Another night in a four-year campaign of catenary renewal in and around Brussels. This is Schaarbeek Station, today's starting point for Strukton Rail's people and machines. A total of 180 sections of 1,000 metres each will be modernised. Quite a few nights to go yet...*

# Train overtakes plane

**The high-speed train service from Rome to Milan has ousted Alitalia from its leading position in the Italian domestic passenger market.**

It is December 2008, and the Frecciarossa is yet to make its official maiden trip from Milan to Bologna, when the CEO of Ferrovie dello Stato (FS - the Italian Railways), Mauro Moretti, lays claim to the future in no uncertain terms. In just a few days, the high speed train is set to reduce the travelling time between Milan and Bologna to just 65 minutes. Rome-Milan can be done in just over 3.5 hours at best. And within a year or two, once the Bologna-Florence line has also been modified to enable speeds of around 300 kph, it will be reduced even further. Mr Moretti doesn't beat around the bush: His 'Red Arrows' are to do battle with domestic air travel, or at least to vie with the newly privatised - though still struggling - Alitalia for its considerable remaining market share of the Milan-Rome route. Mr Moretti aims to persuade some 60% of passengers still opting for airline travel at that point to switch to rail.

Analysts generally consider Mauro Moretti's forecast on the optimistic side. The train will only truly become a serious rival to the airlines if it can succeed in reducing its travelling time between Rome and Milan to less than three hours. However, Mr Moretti's vision is supported by comparable figures from other European countries. In Spain, the Madrid-Seville high-speed rail link has already captured 53% of the passenger market. Furthermore, the TGV's market share on the Paris-Brussels route rose from 24% to 48% within the past four years, while that of the airlines declined from 21% to 7%. Experience has shown that trains and planes are currently pretty much on a par in terms of travelling time for journeys averaging 650 km. The added convenience of the rail journey from centre to centre basically cancels out the superior speed of aircraft. Moreover, trains run more frequently than the airlines. Consider the Frecciarossa, for instance, which is scheduled to make eighteen trips a day in the near future. The fact that the distance between Rome and Milan exceeds the ideal 650 km by a few dozen kilometres is a mere detail.

On 13 December 2008, following a highly slick campaign - train enthusiasts had already dubbed Moretti's Red Arrow rail's answer to Ferrari's Redhead, the Testarossa - the Milan-Bologna service was officially launched. By politicians; by film stars; by big wigs and wannabes alike; by Prime Minister Berlusconi himself, who even donned a conductor's cap for the occasion, pulled fashionably aslant over his right ear. Many a grand word was spoken preceding the actual event. Words relating to the triumphs of modern rail technology, '100% prodotto Italiano', including the smooth installation and setting up of ERTMS 2 - which is more than could be said about other countries. About Italy's historical role in the world of high-speed rail. About the way the Frecciarossa would bring the country's political and financial capitals closer together. Giovanni Cassola, Passenger Transport Director at Ferrovie dello Stato, had already summed up all the benefits in a single sentence: "These developments will significantly improve our mobility, will have positive social and economic

effects and will benefit the environment." The first Red Arrow had a distinct odour of Spumante and departed only two minutes late, which was quite a success in itself. The festivities were not yet over. A month later, on 15 January 2009, the millionth passenger on the Rome-Milan service was presented with a free train ticket and a scale model of the Red Arrow. Then in early February, Mauro Moretti proved to the Senate in Rome that he had been absolutely right. "The new service," he told delegates, "has proven even more successful than expected." He scattered the very latest mobility figures to support this. In less than two months of operating, the rail service had overtaken the airlines. Whereas Alitalia had accounted 52% of all passengers between Rome and Milan prior to the launch of the Milan-Bologna rail service, its market share had now dropped to just 39%. The use of private transport on the route also declined, albeit less sharply, from 15% to 13%. Rail simultaneously increased its share from 32% to 48%. Mr Moretti triumphantly concluded that the train, which had previously appeared destined to suffer an ignominious demise, now looked set to become the mode of transport for the future. "Many people have discovered

that the train is no longer the loudmouth of the transport sector of some twenty years ago, but a far more sedate modality, in which one can work, relax and even conduct a conversation."

The 'Grandi Opere' of which Ferrovie dello Stato currently preaches, however, is certainly not welcomed by the whole of Italian society. For many years, shuttle passengers and commuters from Milan to Naples have complained that FS - read the government in Rome - has done nothing to improve regional rail transport. Delays are rife, the trains are poorly maintained and local trains have to give way to intercity services. Angry commuters in Bologna and Milan even threatened to block the Frecciarossa if swift action were not taken to address the shortfalls of the trains they are obliged to take to work each day. Although Mauro Moretti recognises that there are problems, he denies that regional connections are being deliberately neglected in the pursuit of the success of high-speed links. On the contrary, he claims that the distinction between slow and express services will eventually also improve the punctuality of regional transport.



## THE ROLE OF CLF

Since 1998, Strukton Rail has held a considerable stake (40%) in Costruzione Linee Ferroviari (CLF), a rail construction company based in Bologna. The major construction conglomerate Unieco owns the remaining shares.

The history of CLF is closely interwoven with the development of high-speed railway lines in Italy. CLF carried out construction of the new Florence-Rome link in 1992.

A 20-kilometre stretch of the line had to be rendered suitable for speeds of up to 300 kph. This was the first time that track had been constructed to enable such speeds in Italy.

The Milan-Bologna high speed line - comprising some 180 km of dual track - was built entirely by CLF. The preparatory work commenced in 2002. The actual work for CLF started in 2005 and ended till mid 2007. The high-speed line was opened on 13 December 2008.

Of all Italian rail construction firms, CLF has laid the largest amount of new high-speed track: 500 km. Its rivals each accounted for some 200 km of new track construction.

FS has numerous plans for the further expansion of the Italian high-speed rail network. For several years, it has been awaiting calls for (sub) tenders for the Milan-Venice and Milan-Genoa lines. Although both projects received government approval in 2006/2007, there are still no clear indications as to when they are to be put on the market.

# Room for ambition

## New workshop to accommodate Equipment and Rolling Stock.

Strukton Rail Equipment's old workshop will soon become history as it will be replaced by a new one almost four times its size, offering more than 6,600 m<sup>2</sup> – including modern office space. Over and above maintaining the machines operated by Strukton Rail Equipment, the new workshop will be equipped with a workshop to accommodate Strukton Rolling Stock's activities. If everything goes according to plan, it will be taken into operation by the end of 2011. While the new workshop will remain in the Zutphen station yard, it will relocate one kilometre northwards, further away from the banks of the IJssel River. The plans are ready; the ambitions clear.

Senior project manager Frans Callenbach is in charge of construction for Strukton Rail. He compares the old and new scenarios: "While our existing workshop has served us well for many years, it lacks the facilities and character associated nowadays with Strukton Rail's ambitions. Characteristically, we use the workshop almost exclusively for ourselves. It comprises three relatively narrow inspection and maintenance pits of up to 40 metres in length. The crane facilities are limited and health & safety conditions are behind the times. The new workshop will feature three 50-metre stretches of track with wider pits and two 100-metre-long sections of track with similar pits. One of these will be reserved for Strukton Rolling Stock to revise and install equipment, including new drive systems for passenger trains. At 100 metres in length, the other is long enough to house a conversion train, the longest of all our machines. In order to revise this giant, we currently need to look elsewhere, work outdoors or at an alternative location at great expense. Additionally, I'm already taking account of potential plans to expand with another two stretches of 100-metre track, intended for day-to-day maintenance

work on regional light train carriages. Potential regional train and bus transport companies have already indicated that as far as they are concerned, Zutphen is an ideal maintenance location."

Callenbach outlines a future scenario in which work will become far easier than in previous years: "The building must demonstrably satisfy Strukton's own standards in the field of sustainable construction; it will boast low-energy, climate-neutral facilities. The office facilities have been improved and expanded. The workshop will be equipped with overhead travelling cranes above the pits, whereas the former workshop only had slewing cranes with a limited range. The working environment will also improve considerably thanks to floor heating – in the pits too; it's bitterly cold in winter at the moment. The length of the tracks will also make it possible for all the equipment under revision to be parked indoors without the doors having to be open in winter. I expect this to impact absenteeism favourably and lead to the optimal deployment of existing capacity. With our activities expanding there, I expect diminishing employment opportunities at Strukton Rail to at least be compensated for in part."

Strukton knew in 2006 that sooner or later a new workshop would be needed. It served as a restriction in terms of achieving the ambitions fostered by its host, the municipality of Zutphen. The municipality plans to expand to the west of the railway yard. Part of the old industrial grounds will be used for a new mix of around 1,000 homes, companies, offices and recreational facilities. The area must be made far more accessible than it is at the moment. To achieve this, it will be necessary to dig a tunnel under the yard, exactly where the workshop is situated.



# The star is complete

**The first sleeper was laid in 1993, while final delivery took place in 2009. Belgium is the first European country to complete a border-to-border, high-speed railway network.**

One summer's day last year, the Belgian railway community had good reason to celebrate. The new high-speed rail link between Liege and the German border was complete, and the network infrastructure manager, Infrabel, made a fitting gesture in handing the line over to the users. A festive event in itself, of course. However, what made the occasion truly memorable was the fact that, in taking the line into commission, Belgium had become the first European country with a fully equipped, nationwide, high-speed railway net; a star-shaped network with its core in Brussels and branches that extend as far as the United Kingdom, France, the Netherlands and Germany.

This latest new construction project comprised 36 kilometres of dual track equipped with ERTMS/ETCS and GSM-R. The line is part of the Brussels-Frankfurt rail axis. Anyone opting to travel by train from the informal capital of Europe to the financial centre of the German Federal Republic, is now no longer faced with a five, but only a three-hour journey. Inhabitants of Liege can also reach Cologne 20 minutes sooner. Even regional passengers save several minutes here and there. The eastern branch measures a total of 139 kilometres, on over 100 kilometres of which both express and high-speed trains pass side by side.

Construction itself took six years, while a further eighteen months was spent testing the signalling and the safety system in the 6.5 kilometre-long Soumagne Tunnel. Passengers boarding in Liege and taking a window seat can watch the hillsides of the Ardennes whiz by at 200 kph, before the train enters the tunnel. On exiting, the speed can be increased to some 260 kph, as the train smoothly swishes over the José, Herve and Battice viaducts, into a covered cutting at Walhorn, measuring over 1 kilometre. The newly built line ends there, leading onto a renovated stretch of classic track.

It took Infrabel sixteen years to complete its entire high-speed railway network. This infrastructure manager carried out new construction in four major phases, while simultaneously performing the systematic renovation and upgrading of existing lines. The first phase, towards France, began in 1993 and was completed in 1997. Then followed the Louvain-Liege and Liege-German border sections of the eastern branch. Construction of the Antwerp-Dutch border route commenced in the year 2000. It was commissioned for domestic use in June 2009. The Amsterdam-Brussels high-speed rail link is currently lagging behind, due to a combination of technical problems in the Netherlands and the delayed delivery of high-speed trains by AnsaldoBreda. But the Belgians are ready for it. They have built 206 kilometres of new line and renovated some 108. Completion of the star involved total investments to the tune of 5.2 billion euros.



# German lessons

**Different standards, different values; it called for thorough integration lessons. A Dutch P95 renewal team took part in a training session on a stretch of line comprised of typically German obstacles.**

Gert Meesters and Anthony Sebregts are unlikely to ever forget the heap of rusty steel sleepers lying opposite kilometre marker 57.9. After all, they presented the Dutch Strukton Rail team with a particularly difficult task: How do you replace 285-centimetre-long steel sleepers, when your Matisa P95 renewal train is only suitable for lifting sleepers no longer than 278 centimetres?

The task didn't come out of the blue, however. "We just wanted to practice a little," Mr Sebregts says, clearly understating the issue. And it was all made possible courtesy of Kurhessenbahn, a subsidiary of DB RegioNetz Infrastruktur GmbH, and the good contacts between Georg Reisse GmbH & Co KG and this company. Thanks to their considerable efforts, the Georg Reisse crew and Strukton Rail jointly selected a suitable section of line for the latter to properly acquaint itself with the demands of the German market. "Some of those steel sleepers dated from as early as 1902," Gert Meesters points out. "They caused us quite a few headaches." Steel sleepers are far from uncommon on secondary lines in Germany. The old sleepers are hollow and arch upward. They are rather unmanageable, because the ends bend down quite far. "You can't get hold of them properly, therefore," Gert Meesters explains. "It can be done manually or using the excavator, but that is far too slow."

The solution of the length problem proved equally simple and pragmatic: Twenty centimetres was removed from each of the steel sleepers, using angle grinders and cutting torches, enabling the renewal train to automatically replace them with concrete sleepers. "As long as we reach a stage by the end of the day, in which the next steel sleepers we come across no longer pose a problem, we are happy," Gert Meesters and Anthony Sebregts said later.

## THE RIGHT LENGTH

The route section on which the Dutch learned the differences working on domestic and German superstructure is currently only occasionally used for freight traffic. And it is apparent from the looks of the track, too: steel and timber sleepers and the odd worn rail head, instead of concrete sleepers and continuously modern rail-profile. "We have ample time to practice there," Gert Meesters concludes. Otherwise, this renewal experiment could not have been performed without any disruption of the train service. Or it would have had to be done between trains or during a quiet period of a couple of hours per night. The project entailed constant adjustment and modification of the Matisa's sleeper lifting settings.

The Dutch renewal train adapted some 1,000 metres of track several times. "We first replaced the steel sleepers with concrete ones, which we had brought with us from the Netherlands," Anthony Sebregts explains. That took one day. The rails were simultaneously replaced with new ones, however, while the old rails were burned briefly to be scrapped. "There are no major

differences in the rails used," Anthony Sebregts adds. "S 49 is the lightest of the rails DB uses, while S 54 and UIC 60 sections are the most common." The figures in these codes indicate weight per metre.

The key to success was that the rails had to be cut to size and laid out before the inner and outer curves were installed. "This proved highly successful, and we can be satisfied with the result," Anthony Sebregts says. In the Netherlands, several kilometres of rails are welded together before tamping commences. Replacement is therefore a simpler process. Although: "It doesn't make any difference to the machine whether the rails are welded or not," the engineer admits, after a brief pause to consider the matter. "Provided the bolts in the fish plates are not too long, then they can easily pass through the rail guides. It is important that the rail joints end up in the proper sleeper section." In cases where the bolts prove too long, the Dutch attempt to force the guide rollers over them with a long rod – or they simply detach the roller and move it to beyond the fishplates.

## SETTING THE SPACING

During the next run, the Dutch practice sleepers are replaced with new German-made B70 concrete sleepers. The sleeper spacing applied here is comparable to that in the Netherlands. "One can adjust the spacing on the machine," Anthony Sebregts explains. That will not pose any problem, therefore. The fact that the renewal train stops repeatedly, because a sleeper jams in the lifting unit for the old sleepers, gives no cause for concern. Three or four members of the Dutch crew simply manoeuvre the 300-kilo concrete sleeper to the side of the track with a rope, or they set jammed sleepers on the transport wagon in motion again using brute force and crowbars. "That is standard practice."

There proves to be a slight difference between the height of the old timber sleepers and the new, almost pristine white, concrete ones. Georg Reisse's two-way dragline extracts three sleepers from beneath the spread rails and then removes a couple of

centimetres of ballast. Andy Schöne and Frank Hoos, two members of Georg Reisse, the Strukton Rail subsidiary based in Kassel, then accurately replace the B70 concrete sleepers. The tamping machine performs the rest of the alignment. Both men are satisfied with the collaboration with the Dutch: "It clicks." There are nevertheless differences between the German and Dutch working methods. "Everyone has a designated position in Germany," says Cor Ronda, occupying the cab of the Matisa, "while the Dutch crew all have various duties to perform." Another thing also strikes the Dutchman as peculiar: "Rails in the Netherlands are always welded continuously."

At the end of the afternoon on the second day of the exercise, having concentrated closely on their work for several hours on end, the crew from the Netherlands proves tired yet satisfied. The next day, they are due to adapt the stretch of line again. This time, a ballast train driven by one of Kurhessenbahn's

diesel locomotives is to deposit new ballast between the concrete sleepers. Next, the tamping of the track can commence. According to the regulations applicable in Germany, the rails can only be welded after this has been completed.

## RAISING IN STAGES

Georg Reisse's Plasser & Theurer 09-3X tamping machine arrives from Kassel and is operated by a German crew. "However, the Dutch tamping machine drivers have already gotten acquainted with their German colleagues, and they have exchanged a great deal of experience," Anthony Sebregts adds. In Germany, tamping is carried out on the basis of preset raising levels – during the so-called stabilisation – and is recorded in the form of a printout from a multi-channel graph. "This is a lot simpler in the Netherlands, as there are still no strict guidelines for tamping." Anthony Sebregts continues: "The Dutch sometimes still don't seem to understand that you can only





perform a job in Germany in the prescribed way and that staff members should have a licence. When the foreman at home says lift eighty (80 mm), then we simply do it. You can't do that in Germany, however, as this has to be performed in increments varying from 60 to 15 mm. And anyone who fails to observe this regulation gets his permit withdrawn. This calls for a complete change of attitude among the Dutch tamping machine crew working on a project in Germany, although the first of the training courses for Dutch employees has already commenced."

The exercise performed by the Dutch in Hessen is the first to have been carried out on a secondary line in Germany. Strukton Rail has once executed rail renewal and ballast cleaning operations before. This took place in the Saar region. That was when it realised that work has to be performed according to different principles and standards in Germany, and that unforeseen conditions therefore have to be taken into consideration. The Dutch are currently preparing to perform

new assignments in Germany. Georg Reisse has various branches in Kassel, Mainz and Erfurt. "However, the Ruhr area lies between the German and Dutch companies of Strukton, so that might be an option for both Georg Reisse and Strukton," Anthony Sebregts explains. "My Dutch colleagues should first readjust to the German rules, though."

#### ABOARD THE SAG WAGON

The two men in the ballast crew don't need to acclimatise, however, and they lay out the route section according to the regulations. After all, this yellow rail renewal machine also comes from Kassel. "The Plasser & Theurer SSP 121 D, built in 1994, is the only one of its kind," driver Michael Taubert proudly announces. This machine is the only one equipped with two brush cases and different kinds of brushes: one for timber sleepers and one for B70 concrete sleepers, which have a slight distortion in the middle. Furthermore, the ballast crew has a special deep-sweeping brush, whose long narrow brushes have a gap in the middle. This brush is used for rail sections equipped with an automatic train

stopping system, with the cable running along the middle. "The experience we have gained in collaborating with our colleagues from Strukton Rail has been good so far," Frank Mummert enthuses. He, together with his Strukton Rail colleague Kees Weber, drove the Vossloh diesel locomotive that pulled the renewal train from the Netherlands to the Kurhessenbahn. They were closely watched by countless amateur photographers. They had read about an exceptional transport project somewhere on the Internet. It was, after all, the first time that a Dutch locomotive had run on the German network pulling the P95 renewal train. "The locomotive had to work hard to convey its 800-ton load, and we had to give her full power to achieve 40 kph on the Kasseler Strecke. We did not hold-up regular traffic, however. And she ran perfectly on the level stretches," says Frank Mummert. After all, despite the fact that this diesel locomotive's humble beginnings were in a German factory, she has become a true Dutch lady, and is therefore used to running on level terrain.

# "If you can make it work here, then it will work anywhere"

## Eurailscout serves Swiss Railways using new measurement technology.

Around 180 freight and passenger trains run along it daily, the freight trains good for a daily combined load of some 130,000 tons. No wonder, therefore, that the line between Erstfeld and Chiasso, which crosses the Gotthard Range, is viewed as a lifeline between northern Italy and southern Germany. The line has to be kept in good working order, and Eurailscout Inspection & Analysis carries out parts of the measurements required to ensure it remains that way. One of Eurailscout's most advanced track inspection trains, the UST02 trundles over the Gotthardbahn twice a year, mainly with a view to detecting inherent flaws from depths as small as one millimetre.

This is a highly prestigious project, Production Manager Gert Jansen insists: "If you can make it work here – on such a difficult stretch of line – then it will work anywhere. It really makes a difference in our market if you can cite references in Switzerland, which boasts difficult stretches of line such as the Gotthard." Once the Swiss contract had been concluded, similar assignments were also soon secured in Denmark, and recently also in Norway.

The fact that Eurailscout secured the Schweizerische Bundesbahnen (SBB) contract in 2008, is largely due to the new technology the company spent the past five years developing and perfecting, as the first in a list of international firms pursuing the prize. Gert Jansen: "These eddy current measurements enable us to detect head checks, fine cracks on the interior of the head of the rail. And it was our combination of ultrasonic / eddy current in particular that attracted SBB's close attention, because head checks occur primarily in the curves on the upper leg. And the Swiss rail network is simply full of curves."

#### SHORTEST INSPECTION TIME EVER

However, there was another issue at hand that clearly highlights the tension felt by the guys working at Eurailscout during the past few years. And this tension was still tangible during the inspection run on the Gotthardbahn in the spring of 2009, when this story was written. When we completed an almost trouble-free journey from Erstfeld to Chiasso in the shortest inspection time ever – five hours instead of





the customary eight to ten usually required – the reporter suggested that it was time to celebrate. Gert Jansen replied: “Perhaps, if we are just as quick on the return journey tomorrow. Don’t forget that this is an entirely new system, so you can always expect to encounter teething troubles.”

The troubles Gert Jansen referred to included difficulties with the axle counter that Eurailscout was thankfully able to resolve. This enabled the company to gain re-certification of the UST02 and the UST96 in Germany in 2009, which is valid throughout Europe. The problem in question – which the firm’s rivals are also facing – basically amounted to the two axles under the UST02 on the track inspection coach sometimes causing discrepancies in the axle count, thus triggering the train safety system. Gert Jansen: “In 5% to 10% of the cases, fewer axles were counted at a certain point than had been at the beginning of the line. At that point the signals turn red, for the simple reason that the equipment indicates that an axle has been left behind somewhere along the track. This is highly annoying, of course, as we have to carry out our inspections without disruption to other train traffic. We have now resolved the problem, however, thanks to an entirely new system designed by Steffen Knappe, Director of Eurailscout.” Steffen Knappe replaced the track inspection coach with a system based on gauge measurement, which the firm has since successfully patented. This system not only put an end to the axle counter difficulties but also went one step further! Gert Jansen explains: “In the past, we continually

struggled with the problem of grease deposits, caused by the grease from the rails splattering against the track inspection coach and causing interference throughout. This was particularly a problem here on the Gotthardbahn, with all its curves and loops, which are greased liberally to reduce wear and noise pollution.

In those days we had to stop regularly to clean the measuring equipment. You ended up absolutely up to your elbows in grease. However, we haven’t been held up even once today as a result of grease!”

#### **WATERTIGHT SYSTEM**

Incidentally, the axle-counting problems continued to occur even following the replacement of the track inspection coach - it transpired that the steel housings on the pendulums were sometimes recorded as axles. The pendulums have since been replaced with ones entirely made of plastic, thus resolving these problems once and for all. Gert Jansen: “You have to bear in mind that this sort of equipment is not mass produced, so that faults and flaws often only come to light in the course of operations. It therefore takes a little longer to achieve a watertight system.”

This also became apparent during the return journey. Initially, everything seemed to be running smoothly. The UST02 made its way effortlessly through the darkness, along the Gotthardbahn towards Erstfeld. “Two hundred and three left,” driver Jitse Kalsbeek announced, later followed by two hundred and two, and one hundred and ninety seven – each a sign for his colleague Michael Fink to

press the button whenever we passed the marker posts in question, thus making it easier to later identify the exact location of a problem spot.

In the inspection cab – a mobile office, complete with computer monitors, office chairs, pen trays and printer paper – Mario van Maaren monitored the flow of incoming data. “Look, those are boltholes,” he pointed out. “We can see them thanks to the ultrasonic feelers placed at angles of 35 and 0 degrees.” Then, shortly afterwards, he spotted a thermal weld with a major defect; a clear case of a red spot. “We will report it immediately, as it could shear at any minute, and therefore needs to be replaced as soon as possible.”

#### **LOST SIGNAL**

Another monitor displays the incoming eddy current measurement data. This technology is largely responsible for Eurailscout’s success in securing a multi-annual contract with SBB; the reward for its future vision and the tenacious perseverance of both its engineers and the train crew. After all, many of its rivals had written eddy current off years before, while Eurailscout proceeded to purchase and further develop it into an extremely useful technology. In fact, useful is rather understated. It’s a godsend, because – as everyone in this sector agrees – head checks are an increasingly occurring problem throughout Europe.

As we continued to watch the monitor, Mario van Maaren piped up again: “Here we go again,” he grumbled. And before we knew it,

the UST02 drew to a halt once more, at the end of the Gotthard Tunnel of all places. Not really the sort of spot one would choose to have a picnic. We were no longer receiving a signal, and there could have been various reasons for this disruption. The crew initially feared that the feeler carrier had been bent inwards, even though the laser was still working properly. That had occurred before. “Typical example of teething trouble,” Gert Jansen says. It was not the case this time, however, nor had the laser become covered in grease. The cause was much simpler to detect, in fact: the computer had frozen. So once it had been reset, the UST02 was able to resume its journey. Amazingly, the return journey was actually quicker than the outbound one.

#### **EDDY CURRENT TIPS THE BALANCE IN SBB’S ULTIMATE DECISION**

“The improvements even surprised us. The measurements can now be even more accurately located, while the gravity of the faults encountered can also be more accurately assessed. And thanks to the new system, which uses bifilament pendulums instead of track inspection coaches, we no longer have any difficulty with axle counts or grease deposits.”

Albert Amacher, Schweizerische Bundesbahnen’s team leader at the Ultraschallgruppe Luzern, makes no bones about it. He is highly satisfied with the deployment of the UST02, while relations with Eurailscout are also very good. “Eurailscout focuses very closely on customer requirements. Just consider the standards for

error messages, for instance. In some cases, ours are less stringent than Eurailscout’s. They nevertheless remain open to suggestion. We are therefore currently examining the possibility of developing joint standards. I am particularly pleased that there is scope for such measures.”

#### **TECHNICAL INNOVATION**

The decisive factor for conclusion of the contract with SBB, however, was the technical innovation that Eurailscout has achieved in terms of eddy current measurement. Albert Amacher: “Eddy current is the sole means of detecting head checks. And the earlier they are detected, the better, as this gives us the opportunity to remove them by means of grinding. This in turn contributes to the useful life of the rail, while also boosting operational safety.”

Head checks occur primarily on new stretches of line, on which trains operate at higher speeds and increased axle loads are generated. Albert Amacher: “Two newly built stretches of line were recently commissioned: the 35-kilometre-long Lötschberg Base Tunnel, and Mattstetten-Rothrist line which measures 45 kilometres long. As trains reach speeds of up to 250 kph there, the rails have to be absolutely immaculate. Furthermore, work has also commenced on the Gotthard Base Tunnel which, at 57 kilometres long, will become the world’s longest when it replaces the old one. SBB basically had these sorts of lines in mind when it opted for eddy current.”

Mr Amacher admits that the technology works well. So well, in fact, that SBB has had to

expand its capacity just to check all of the faults detected by means of eddy current measurement. “Not all of these faults require direct action. It all depends on the on-site situation, which our staff confirm using mobile equipment.”

#### **MUCH IMPROVED**

Despite all his praise, Albert Amacher has one criticism concerning the performance of the UST02: “It sometimes detects a problem, which fails to show up when re-examined six months later. Then it suddenly reappears another six months later. The problems in question are nothing major, of course, otherwise we would respond immediately. I am naturally well aware that the technology is still new, and that there is scope for improvement. Furthermore, the UST02 rocks a little, which can slightly alter the angle of the detector in relation to the rail, causing it to miss a crack now and then. A perfect detection score is simply not feasible.”

The fact that Eurailscout is getting pretty close to perfect, however, becomes apparent as Albert Amacher reflects on the 1990s – he has been working in the Ultraschallgruppe Luzern since the 1980s – when the old UST76 ultrasound detection train was still operating. “The red spots that we came across in those days were vast. There were also far more occurrences. The fact that detection has much improved in the meantime, means that we encounter far fewer red spots of great concern. We simply detect them much sooner nowadays.”

## Always have candles in the drawer...

Always have candles in the drawer and matches next to them. The paraffin lamp should be filled and close at hand. A cool box next to the fridge. Batteries for your torch and your safe, at home and in the car. A little diesel or petrol generator, if you can afford one at least. Although it's not as common an occurrence as it used to be, a sudden power cut can still happen at any time at all. So, it's always best to be prepared for it. And one more thing: if it happens in the evening, you'll immediately know the score; but if it happens during the day, you may well come home to find the fridge paddling in a pool of water. And should it transpire that it's actually burned out, then that's because the power company managed to reconnect the electricity in the meantime, but the fridge couldn't cope with the initial surge.

However, there is also a standard formula for a successful family party. Whatever you do, never call in a DJ! Simply invite family and friends, have them bring their own family and friends along, and friends of friends, fire up the barbecue, get out the Johnny Walker and make sure there is someone who can play the 'scratchee', the bass drum that is the root of all rhythms. The drummer will bring along some of his mates: conga, washboard, saxophone, trombone, trumpet, maracas and suchlike. Then they really get down: 'scratchee poku!' And if the lights go out, then the candles, the cigarette lighters and the paraffin lamps are simply lit, while the whole family continues to dance even the darkest of nights away. No, you don't want a DJ, 'cause they need a mains connection, which can never be relied on completely.

Some time ago, particularly prior to 2005, power failures used to occur at the drop of a hat in Paramaribo. Entire districts' electricity supplies were cut off in turn, because the existing network couldn't handle the power load. Other districts chronically needed to be attached to a feeding tube. Take for example the Zorg en Hoop district, which was supplied by cables that were far too long. The district needed a lot of power and regularly received too little. This, in combination with the cables being too long, led to considerable voltage fluctuations. And voltage fluctuations, as we all know, involve a high risk for all household appliances. The entire 230,000 strong population of the Surinamese capital is therefore familiar with these phenomena. And they are well aware that the power is cut more frequently in the working class neighbourhoods than in shopping malls, the presidential palace and districts like Uitvlugt and Ma Retraite. But then, burglars are more inclined to strike during a power cut, and there's naturally more worth robbing in the more upper class neighbourhoods, so... I suppose it's only logical, isn't it?

However the power company is not always to blame for computer crashes and spoilt meat, when a district suffers a prolonged electricity failure. Now and then a branch is blown off a Kankantrie or kapok tree onto a 161 kV overhead transmission line, running alongside the highway, or kids see their kites nose dive into the high-tension cables, causing a short circuit between two phases and crashing in a shower of sparks. Goodbye kite. Goodbye power. Grandpa had warned them.

*\* Sincere thanks to Bud Jokhoe*



# Power for Paramaribo



## A consortium led by Strukton Systems is providing the Surinamese capital with new energy systems.

In 2002, the Surinam Energy Company (EBS) called for international tenders for the construction of a new substation at Tourtonnelaan and extension of the two existing 33kV and 6 kV substations, including new panels, switch systems, several kilometres of cabling and the attendant transformer stations in the residential districts. That proved the first step, albeit a modest one, towards a reliable transmission network for the city of Paramaribo. A consortium led by Strukton Systems and partnered by Twentsche Kabelfabrieken (TKF), ABB Rotterdam, CCC Germany and two Surinamese parties, UCC and Hitelcom, beat rival bids from the USA and India. The project was completed in 2006. In the meantime, however, preparations for the second step – a far larger one – had already been made and the deal was signed and sealed.

Bennie Zwiens, Project Manager at Strukton Systems, was involved in the venture from the very outset: "As our initial project was nearing completion, we carried out a study of the remaining problems and the crucial weaknesses in the power supply system. We devised solutions to the problems encountered, which were developed into a proposal. The second project was dubbed EVP+, an abbreviation of Elektriciteit Verbetering Paramaribo, which stands for Electricity Improvement in Paramaribo. Next,

a feasibility study was performed. Verse three was the finances. The EBS had rather limited financial resources. We had to make a considerable effort, but succeeded in securing the necessary funding in the form of a development grant from the Dutch government and a loan from Rabobank for the EBS." As a result, the Dutch consortium was able to continue with the construction of an improved distribution network.

EVP+ encompasses the construction of new substations in the Peperpot and Zorg en Hoop districts, over 200 kilometres of cabling and wiring, almost 4,000 connections to households and businesses, as well as – the exciting part – the replacement of the systems in the city's main power plant. Bennie Zwiens: "We are to perform a conversion project during the first half of 2010, while business operations, the power distribution, have to continue as usual. If anything were to go wrong during the conversion, then the whole of Paramaribo would be left without electricity. And that is simply not permissible."

The Zorg en Hoop substation was handed over to EBS in July 2008, while the Peperpot station is scheduled to go online in April 2010. Once the EVP+ project is completed in 2010, will the whole of Paramaribo be able to count on a reliable energy supply? Bennie Zwiens: "Although there are still one or

two weak spots, I would estimate that around 80% of the city will be equipped with a stable network by that time. It already has a reliable power plant, which vouches for the supply to the substations. The former weakest points at Tourtonnelaan, in Zorg en Hoop, Morgenstond and Peperpot have already been redressed by new substations. Those districts will therefore no longer suffer blackouts. Nor should there be many power disruptions in future."

There is also plenty of work remaining for Strukton Systems, TKF and ABB in Surinam even after 2010, and not solely in the outskirts. Surinam is currently experiencing a period of economic growth, practically oblivious to the credit crunch. And a great deal of additional energy will be required to feed further growth. Bennie Zwiens envisages increased annual demand of around 10%. "This calls for further generating capacity and additional substations." Gregory Allan Rusland, Minister for Natural Resources, speaks in terms of even larger figures. In the Surinamese weblog, Waterkant, he forecasts that during the next fifteen years, the energy requirement will rise to 300 Megawatts, three times the energy company's current capacity. Bennie Zwiens: "We are very keen to continue to play a prominent role in those developments."



# Internationals in Norway

**Dutch is hard, Flemish impossible and there are three Scandinavian words for ballast...**

Eleven hours of work, including night work and being on call. That's how the 24-hour schedule looks on the rolling weekly timetable for the trio who, every other week, man the 120 tonne universal tamping machine Unimat 8 that is currently tamping track and points in southern Norway. Work started in April and continued until November, when the heavy frosts set in. There will be similar work in the Netherlands again this winter.

Tonight at 10 pm the car sets off from the house in Storo, a suburb of Oslo. The three men won't be back until five in the morning. The task for the night is tamping of 350 metres of double track and four points at Ski, about 30 km south of Oslo. Strukton Rail's Unimat 8, a big yellow beast, will be realigning points and track here, rumbling along half a metre at a time, lifting the track and simultaneously packing ballast under the sleepers to rectify the track geometry with millimetre precision. It is particularly important that the crossings between the points are not warped once both parallel tracks have been tamped. Otherwise there is a risk of derailment.

Each working week is followed by one week off, when the next team works. The trio for this night comprises Swedes Håkan Johansson and Ronny Ljung, plus Norwegian Lars Horten. Håkan Johansson keeps an eye on the displays and follows each move on a monitor. The track is lifted and prised sideward to eliminate any deviations and bring it in line with the ideal

values set. A printer next to the driver records the results of the night's work. Ronny Ljung, who sits in the heart of the tamper, makes sure that the track is always lifted at the same time as the vibrating tines are dropped down between the sleepers on both sides of the rail. Tamping is carried out on long stretches of track and sometimes only at spots where the track has sunk.

## ALWAYS WORK

"Two companies have been acquired in Norway and are now part of Strukton Rail, so we are now hard to beat as a player when it comes to track realignment in Norway. And as long as the track is bedded on ballast, we'll always have work," comments Tommy Kumlin, who is also working on the project in Norway. In Norway, infrastructure manager Jernbaneverket is responsible for planning what needs to be done, based on measured deviations from the ideal track. The list of deviations is sent to Strukton, which in turn submits an order to the rail traffic managers specifying requested times for the trio's work. Before the work starts, Lars Horten receives all

the timings for the activities during the night. The languages spoken by these international engineers are a bit of a mixture, though the Flemish in Belgium is impossible, according to Lars. "Dutch is also hard. We mostly speak English, although the technical terms are often in German. Even the Nordic languages have their problems. For example the word for ballast is 'makadam' in Swedish, 'pukk' in Norwegian and 'skerfer' in Danish."

## PERMITS

Strukton has a seven-year contract in Norway, with an annual opt-out. This means, in theory, that they could lose the contract after this winter. Contracts in Sweden are set for five years with an option of two more years if the customer is happy with the work. This makes it easier to achieve continuity in planning and production. However, Håkan Johansson points out a clear benefit of the engineer's life in Norway compared with Sweden. "Here in Norway we're given a train number so that we are classed as a train and can run along the whole route. In Sweden we have to apply for

a permit for each little subsection. If we don't get the right permit for all the sections, we have to start the process again. And the fact that we can only communicate by fax means that it can take hours. Things are a bit more bureaucratic in Sweden, but it will get better when all machines are classed as trains," states Johansson.

The trio are working well together, even in their free time, when they all need to eat, wash up and clean up. The kitchen in the little house in Oslo is immaculate, although they have different eating habits. The alternative of staying at a hotel is both expensive and impractical when you need to sleep during the day. "It would be over 8,500 euro a month to put the three of us in a hotel compared with about 1,000 a month to rent this place", Håkan Johansson tells. "Here we can sleep in peace until around 2 pm. We never have a night out, except maybe when the tamping machine needs servicing. Then you might get a day off to visit Oslo. But on top of our normal work we have periods when we're on call for emergencies."



# “...you’d have to ask Mr Erdmann himself...”

**Ulrich Erdmann is the proud father of IRISSYS, which is a software program that has become the standard for the processing and application of measurement data used in rail management and maintenance in an increasing number of European countries. How a twist of fate brought an East German nonconformist to the forefront of Europe without actually having to defect...**

## 1.

“Nineteen thirty-three was the key year.” Afterwards, he continues with an almost apologetic smile to explain that it was to become the equivalent of a ‘telenovela’ as they are known in Latin America. “An East German version of Rich Man, Poor Man as it were.”

Ulrich Erdmann laughs easily and infectiously. Only when he speaks of his life prior to 1989 does his demeanour take on a sharper, more sardonic edge. He shambles along in a carefree storytelling manner - and regardless of how often the interviewer sidetracks him, he invariably returns to the storyline. And he doesn’t drop a single stitch along the way. That is one of the traits of his trade, which is all about structure. He has a light and versatile speaking voice, which is undoubtedly the result of his singing.

Mr Erdmann lives and works in Görlitz, on the banks of the River Neisse, which forms the frontier with Poland and is a mere stone’s throw from the Czech Republic. With a population of some 57,000, Görlitz is a central European city which features something of a baker’s dozen of architectural styles, varying from a rather sloppy Sachertorte dating from the 13th century, through countless marzipan creations in pastel shades, to the straight laced, unimaginative tenements of the GDR, which resemble the cake box itself. Mr Erdmann has acquired a fin de siècle office villa, verging on the municipal park and close to the river, where he and his staff of around thirty work. Welcome to Erdmann Softwaregesellschaft! He appears rather small, seated in the sumptuous conference room. Among all the dark timber panelling, pride of place is reserved for a highly serene abstract painting, in which white is the dominant shade. A work created by a friend.

## 2.

“I was actually born in Magdeburg, although I went on to study electronics and meet my wife here in Görlitz. I was a teacher. However, I had yet to turn thirty and teaching was already beginning to get me down. Furthermore, I had political problems. Let’s just say that I wasn’t exactly one of the former GDR regime’s blue-eyed boys. I was what they referred to as a political troublemaker. In the East German Republic of the 1980s, one had only to grow one’s hair and listen to the wrong type of music to be considered part of the opposition. Much the



same as in the West in the 1960s, I suppose. However, I also had the audacity to enter into debate with the State, which led to several brief, yet highly unpleasant encounters with the Stasi. At a certain stage, I decided to apply for a job at Deutsche Reichsbahn’s (German Imperial Railways’) institute for science and technology, not far from here. They were engaged in the development of a new automatic coupling system for railway wagons. Given that it was a highly confidential project, I certainly wasn’t going to be permitted to take part... although they did have something far less delicate for me to do. I was designated to the development project for an inspection vehicle that could record rail geometry. There are standard vehicles nowadays, such as the UFM 120. But it was very much new ground in those days. The Austrians had one already, but we didn’t have the money to buy. We had to develop our own, which was ultimately dubbed the OMW, a track inspection vehicle. I developed a program for it despite working under far more difficult conditions than those in the West. We

couldn’t calculate as quickly, and one Gigabyte would have been a universe of space for us. It was no easy task for me to set up a program with a configuration that actually worked. After around three years of hard work, however, the OberbauMessWagen was finally completed, registered and ready for deployment in 1987. And then came ‘Die Wende’ or the Turnaround, which ultimately led to the fall of the Berlin Wall and reunification. Incredible... I had never really believed that it would happen.”

## 3.

The two rail companies, Deutsche Reichsbahn and Deutsche Bahn, were quick to join forces. It transpired that Deutsche Bahn had also developed an inspection vehicle at their own institute of technology in Minden, although their project was less advanced than that of their counterparts in Görlitz. Furthermore, they had a shortage of staff. They therefore inquired whether Deutsche Reichsbahn perhaps had someone available who might assist in the further

development of DB’s inspection vehicle. Yes, they did, came the reply: A chap called Erdmann, who had done that sort of thing before.

“Only years later, did someone admit to me that they’d had their doubts about me in Minden. They thought it was unlikely that I had sufficient understanding of the technology. However, I’d only been in Minden for around four weeks when my new colleagues began to ask me for technical advice. I did programming in Görlitz as well as adjustment and testing in Minden. We continued to cooperate in this manner for about a year. I had taken charge of the entire software development project in the meantime, when I was made an offer. I was to become a permanent fixture in Minden. However, I am also quite a local patriot... I therefore replied that the more of us who made the move to the West, the fewer would remain at home. I wasn’t quite sure what the future might bring, but took the chance to join two colleagues in setting up an independent business. That was in 1991. We decided to



just give it a go. As a small engineering firm, we built networks, sold computers, but nothing to do with rail at all. Then Deutsche Reichsbahn approached me again. Perhaps I would consider going to Magdeburg for three or four months to impart my knowledge, for a modest wage of course? The Deutsche Reichsbahn aimed to present a new man in Minden. I said that I thought not... A short time later, however, our agency was awarded the contract to further develop the software for the Western inspection vehicle."

#### 4.

In those days, Deutsche Bahn had become acquainted with Doctor Yellow, an inspection vehicle from Japan that independently inspected a great deal more than just rail geometry. Germany has special inspection trains for track geometry, catenary, ultrasonic inspection, etc., which produce piles of paperwork, which nobody can analyse in coherence. Deutsche Bahn's idea was to manage all inspection data in one data bank system and thus get a coherent insight into the condition of a section. This was the

so-called integrated condition analysis. Would that be possible? And if so, who might achieve it? The answer to the last question was soon answered.

Mr Erdmann was initially assigned to work out the basics for a draft design. Within six months, he had laid the foundations for something that would later become known as IIS, the Intelligent Inspection System. By this time it was 1993, time to present his ideas to the management of Deutsche Bahn.

"I was granted two hours to convince the management of DB of the merits of my draft design. Those two hours simply flew by. 'Very well, Mr Erdmann. And how do you intend to proceed from here? How much do you think it would cost to produce the initial version of the software you have in mind?' I was asked."

And with this gesture, the key was presented to Ulrich Erdmann that would ultimately give him access to a substantial part of the European market. Having secured the contract, he swiftly proceeded to establish Erdmann

Softwaregesellschaft to operate alongside his existing computer firm. It was also based in Görlitz, of course, not in the West. Contrary to what Mr Erdmann chooses to suggest, however, it did not go on to become a 'telenovela', but – due to the lack of dramatic setbacks – an unadulterated success story.

#### 5.

Deutsche Bahn continues to use the Intelligent Inspection System to this very day. Erdmann proceeded with its further development until 1997, at which point it was suitable for network-wide utilisation. The package of subsequent contracts it was awarded mounted up to a value of several million.

Then in 1999, Eurailscout appeared on the scene. It was to inspect the German network, and inquired of DB how it would prefer to have the data presented. "They said: You'd better ask Erdmann." The emergence of Eurailscout also placed the Netherlands in the picture: Strukton. "It also expressed a keen interest in acquiring a program such as IIS. The circumstances were as follows. Although ISS

was the leading system at the time, its software was not suitable for unaltered implementation in another country. This was not so much a matter of the operating rights, but rather the fact that ISS had been set up specifically to comply with DB's wishes and requirements. So, it couldn't be passed on at the time – and it still can't. We ultimately had to develop an entirely new system for Holland, which could be swiftly adapted for the most extensive range of railway structures. It had to be a more universal one. The underlying principle remained: Consider the steel road as a complex of information. And it had to be set up in such a manner as to enable the customer to implement the system as it sees fit, without our assistance. And finally, it also had to be able to cope with the truly major European countries' databases."

The finished product is known as IRISSYS, an acronym for International Rail Inspection and Services System. It was completed in 2004, and Strukton Rail was the first customer to take delivery. "The Netherlands served as a catalyst." In 2004, the program became

standard kit throughout the Dutch rail sector. Throughout the years, Erdmann has built prototypes for Slovenia, Italy, Finland, Norway, Russia, Poland, Serbia, the UK and Morocco. The Danish rail company Banedanmark also purchased the program in 2009. However, there are still ample aspirations. "Our philosophy is to render IRISSYS the European standard. We aim to have made substantial inroads in all major European countries within five years. We are currently engaged in negotiations with some of them."

Then, there's another aspect that raises a smile. In April 2008, Ulrich Erdmann was contracted as a consultant to the Ministry of Transport, Construction and Urban Development. His official remit is to cooperate in securing long-term state investments in public infrastructures. In practical terms, this implies that Mr Erdmann checks whether Deutsche Bahn receives a qualitatively high-standard infrastructure for its annual investment to the tune of 2.5 billion euros. DB makes it visible using IIS, while Erdmann confirms it using IRISSYS.

#### 6.

If IRISSYS is now complete? He shakes his head in reply. The most advanced inspection vehicles have already been fitted with new instruments, such as eddy current monitoring. The question remains what one will have to do during the next few years with a view to improving quality while cutting costs. Things are already pretty reasonable in those areas, but there's always scope for permanent improvement.

"A further ambition for the future is to render IRISSYS applicable in for example the petrochemical industry or the field of road maintenance, perhaps even the overland transport of oil or in high tension electricity cables. Anything that even vaguely resembles a network and has a longitudinal dimension basically. However, I'm not going to pursue those aspirations myself. A mirage? What makes you think that? We are already on the lookout for companies with specialised knowledge in those fields. Although I'm pretty

much at home in the world of rail infrastructures, I know absolutely nothing about those sorts of structures. I'd therefore be better advised to leave this work to other specialists."

Having reached the age of 52, he is currently learning how to delegate responsibility. It's a learning process, for which you have to pay your dues. You have to be prepared to give people the chance to make the mistakes that you've already made before them. Incidentally, he trained the majority of the people in question personally, after engaging them straight out of school. It's bound to turn out right in the end.

"I've been working very hard for so many years now, although I have discovered that there's more to life than just work. I've therefore started to pursue other interests in my spare time. I only work a fifty-hour week nowadays. I started attending the music academy again some years ago, to study both classical and jazz piano. But I am also a member of a rock band, which plays hard rock, including ZZ Top covers. You betcha! Furthermore, I'm taking singing lessons, because I like to sing jazz. Nothing like a bit of crooning. Fly Me to the Moon and that sort of thing. And I also like to go dancing." He pauses briefly. "And then, of course, I also have a 12,000-litre salt-water aquarium at home, full of corals and tropical fish. And I am having a green house where I cultivate tropical plants."

Mr Erdmann noticed that the interviewer's expression adopted the semblance of a remarkably large question mark during the course of his final few sentences. His own expression changed to that of a doctor bearing good news, as he reassured him: "It can all be done, you know! It's just a matter of discipline."

# The watchdog named POSS

**POSS monitors the critical points in the Stockholm metro, in the city and throughout the region, now both below and above ground.**

It is better to take steps to avoid breakdowns than it is to be ruled by breakdown recovery times. After all, punctuality, reliability and safety are good for customer satisfaction. This is exactly the attitude adopted by Storstockholms Lokaltrafik (SL), the operating and management body responsible for the Stockholm Metro and a number of connecting overground lines in the region. It is therefore preferable to keep a close eye on points at all times; after all, a simple points disruption can prove disastrous to timetable punctuality. SL currently does just that throughout its network using POSS, the preventive maintenance and breakdown diagnosis system developed by Strukton.

It all began in 2004, with a series of tests on 23 sets of points around Gullmarsplan Station. And further connections were soon to follow. Lennart Sjölund, Signalling Engineer at SL: "The tests proceeded favourably. It proved that the system could be easily connected to the network." By the spring of 2007, over 160 of the most vital sets of points in SL's underground network had been connected to POSS. In 2009, SL placed orders for a further 36 connections for the metro

and 15 for one of its regional lines. It also intends to connect another 30 sets of points in the coming years.

Rob Redeker, Technical Consultant at Strukton Rail, refers to SL as one of the most active customers: "SL has already connected its most critical points to POSS. The success of the application in the metro has led to the steady expansion of the system to the regional lines. SL wants to have all of its critical points at its fingertips."

All of SL's points are controlled by means of alternating current (AC), which is in stark contrast to other major POSS users, such as the UK, Italy and the Netherlands, that use direct current (DC). In certain cases, POSS graphics have a slightly reduced resolution when using AC. Rob Redeker: "We have now developed a version – MicroPOSS 2.0 – especially for AC points, which was introduced to the market at the close of last year. The European market is basically half DC and half AC. This new version of the system is aimed primarily at countries like Germany, Switzerland, Austria and Hungary. However, SL is to have the honour of being the first; we are going to implement POSS 2.0 on Stockholm's regional lines in 2010."

POSS technology is entirely Internet-based and comprises sensors that transmit data on points behaviour by GPRS/GMS-R or fibre connection to the central database, which is connected to an Internet server. The user can then distribute, analyse, report on and present the data at any given time.

POSS is currently utilised in eight European countries and Australia. The British rail network controller, Network Rail, also equipped all 600 crucial sets of points on its fully renovated West Coast Main Line with the system. Some 1,300 sets of points in the Netherlands are also connected to the POSS monitor. In 2008, the Dutch railway manager ProRail replaced its first-generation software dating from 2003 with the latest version. Expectations are that large numbers – perhaps even several hundred sets – of points in the Netherlands will be connected to POSS within the near future.



Jaap Balkenende  
(ProRail):

## "Scoring in the field of sustainability"

**What could possibly be innovative about a tender? The customer and contractor explain the process preceding the contract.**

The track bed already marks the way, a grey ribbon stretching from here to yonder. Since the beginning of 2007, dozens of contractors have been working on the Hanze Line, the Netherlands' final new rail construction project for the time being. This implies that, thanks to the implementation of systems such as ERTMS, trains will soon be able to achieve speeds of 200 km per hour on the 50 km section of dual track – with the exception of just two bends – between Lelystad and Zwolle, which is to serve as a new link between existing connections. The line will bring the northern Netherlands and the Randstad conurbation – and therefore Schiphol Airport, too – twenty minutes closer together. Furthermore, once the new line is commissioned, it should relieve congestion on the existing North-West connection and the transfer stations of Utrecht and Amersfoort.

ProRail put the superstructure out to tender early in 2008. Bids had to be submitted by

November. However, one of the bidders proved so enthusiastic that it was unable to keep things quiet until the deadline. ProRail had submitted an innovative tender, thus setting a new trend and sustainability became the magic word; the bidder was simply brimming over with ideas.<sup>(1)</sup>

So what was so innovative about the form of ProRail's tender? And what in turn is then so innovative about the winning consortium's plans? Jaap Balkenende, ProRail's project manager for the Hanze Line, has the answer to the first question.

"The contracts for the Hanze Line are all Design & Construct. And although that's not entirely new in itself, it does entail a considerable degree of innovation. Those sorts of contracts were also awarded for the Betuweroute, the first that ProRail put out to tender. If one now compares those with the contracts for the Hanze Line, then it becomes clearly evident that we have implemented all

manner of modifications and improvements. These are mainly related to the issue of how one might create more scope for the designers. This is a complicated matter in the rail sector, as the framework of design regulations applicable is pretty stringent. One of the major differences is that we now attempt to draw up less detailed and more functional specifications. Of course, even these have their limitations. Wherever there is room to offer leeway, however, we certainly do so. A prime example in the field of superstructure is that contractors are permitted to optimise the number of substations. As a result, some submitted proposals encompassing fewer substations than we had expected would be necessary.

A good example of this freedom is the bridge over the IJssel River. There was much debate on the issue of whether a bridge or a tunnel was to be constructed. The powers ultimately opted for a bridge, but stipulated that it had to be an aesthetically appealing one. It was

<sup>(1)</sup> In *Cobouw*, 4 October 2008



therefore understood that it might cost a little more than standard. What we then did was to let the design of the bridge determine the proposal selected. Normally, one would set technical requirements and the design would have to be approved by the buildings aesthetics committees. Next, the least expensive bridge would be built. However, the bridge over the IJssel shows how we can allocate quality priority to price among the selection criteria. We set a financial ceiling, then simply said: 'We want the best-looking bridge.' We did so entirely in Design & Construct, while setting seven, broadly defined design criteria. In addition, we produced a sketch of the kind that a three-year-old child might if asked to draw a bridge. That was the reference design. Candidates were otherwise entirely free to decide for themselves, including the choice of materials. We received five bids, each of which comprised a stunning design. The choice was to be made for 60% on the basis of design, spread over two rounds. The initial selection of three designs was based 100% on design. An independent committee was allocated responsibility for the decision process. It entered into competition-based dialogue with the bidders. This is a form of tender which I think I'm correct in saying is unique in the field of infrastructure works in the Netherlands. I've never heard of it being applied abroad either, for that matter."

**Can this same principle be applied to the contract for the superstructure?**

"The train of thought is the same. There are two aspects we were keen to pursue in the superstructure contract. The one, which is rather exceptional, is its integrated form. We lumped all of the technologies together in a single contract. This comprises noise barriers, track, overhead power lines, load-bearing structures, security, control and energy supply. This implies that the contracting party bears responsibility for complete interface management. We also allocated the 'safety case' to the contractor. This means that we leave much more to market parties. Not that we relinquish all involvement on our part, but rather that we afford the bidders greater scope to pursue their own ambitions. This is by no

means unique on a global scale, but with the exception of the HSL Zuid project, it has never been done before in the Netherlands.

The other aspect is sustainability. Central government is keen to ensure that all public tenders are sustainable by 2010. This is a noble endeavour, which we also share. We therefore closely examine the possibilities of introducing sustainability to rail infrastructure. There are various means of doing so. We might have indicated what we ourselves consider sustainable. However, we opted not to do so. We set a number of criteria instead, then challenged the contractors to submit proposals which met these criteria. These also weighed in the award criteria. Consider carefully, contractor, how things might be rendered more sustainable – and if you perform well in these areas, then you will be awarded points."

**What are those criteria?**

"Energy consumption during the construction phase, energy consumption during the operating phase, locational factors such as noise during construction, fine particles, the sustainability of the materials used. These are areas in which points can be scored. An independent committee assessed the proposals submitted. The difficult thing is that there are not really many established standards yet, with which to gauge sustainability. Energy is relatively simple, as you can express that in kilojoules. Noise and fine particles, however, are more difficult to compare. We have adopted a progressive attitude in this respect, leaving it to independent experts to assess. At least it is a start; things are further developed in the field of buildings than for superstructures. Our intention is to start a process whereby we challenge market parties to devise more sustainable solutions on the one hand, while learning how to adapt our design standards accordingly at the same time."

**Are you implying that there's an area of tension there?**

"Yes, I certainly am. We at ProRail apply a system of design regulations, which were established on the basis of extensive research that concluded that a certain structure is safe.



Whenever a sustainable alternative is proposed therefore, the rail infrastructure manager first wants proof that its safety is assured. We continually have to address the issue of which innovations are acceptable, or whether in implementing innovations, one can still vouch for both the safety and availability of the

railways. The contractor therefore has to issue both proof of increased sustainability and safety assurances, before we can accept such innovations. The parties did their utmost to come up with sustainable alternatives. Some sixty innovative proposals were submitted in total. That's quite a large number."

Eric Weerepas (HanzaRailTeam):

“Winning on the basis of ingenuity”

Three consortiums made it through to the pre-qualification round: BAM/Siemens, Dura Vermeer/Bombardier and the HanzaRailTeam. Each of them witnessed the way their ideas were subjected to meticulous consideration by the independent committee appointed by ProRail purely for this purpose. Each concept was critically examined, then considered favourable or unfavourable. The unfavourable ideas were rejected, while the favourable ones were elaborated, the costs estimated and included in the ultimate bid. The 'most economical' bid was to win the award. And that proved to be the one submitted by the HanzaRailTeam, the consortium established especially for this tender and comprising VolkerRail, Strukton Rail, Alstom and Arcadis – two major, internationally oriented rail contractors, a French giant in the field of rail safety and far beyond, and a global consultancy firm of Dutch origin. In May 2008, the signatures were applied to a contract for the superstructure to the tune of 164 million euros.

*How did the winning party develop ProRail's approach? How innovative was it actually permitted to be? This time, the answers are supplied by Eric Weerepas, Head of Planning & Control at Strukton Rail.*

"We are always very keen to see the award

criteria. These showed that we would be able to score 10% of the entire sum of the tender on sustainability aspects. That is pretty considerable; higher than we had ever experienced at least. One thing was evident, however: all of the consortiums that had submitted bids could certainly calculate. We got the impression that the only way we would be able to win was on the basis of ingenuity, and certainly not simply cost-price calculation. That meant we would have to devote considerable attention to sustainability. We soon figured out that the entire sum would be well in excess of the 100-million-euro mark, which meant that the notional discount of 10% on one's bid was a great deal of money."

**Was it an innovative process?**

"In this form it was, yes. It is not unusual to submit ideas for such major works. And suggesting alternatives is pretty commonplace. However, this was the first time that we had actually been given firm incentives to consider sustainability. We were presented with four options, four aspects for which scores of 2.5% could be achieved. These were energy consumption during realisation; energy consumption during the operating phase; locational factors during construction, including noise, emissions and nuisance; and the



sustainability of the materials used. Volker, Strukton, Alstom and Arcadis were quick to get during the course of brainstorming sessions, which were regularly held and attended by a complement of around fifteen, a mix of highly experienced old hands and new, refreshing minds who adopted a very uninhibited approach. The wildest ideas were conjured up during that preliminary stage. However, rational thinking gradually gained the upper hand. The committee appointed by ProRail also paid less attention to the costs and more to feasibility during the preliminary stage. We subsequently proceeded to elaborate all of the proposals that the committee assessed as favourable."

**What were you left with?**

"We had a total of eighteen favourable ideas. These included several that we cannot reveal, with a view to maintaining the competitive edge, and several that simply never made it through. We devised a construction method that would enable us to use lighter rolling stock. This implies reduced diesel consumption, and therefore reduced CO2 emissions also. We intend to use ecofuels and

lubricants for our machinery and segregate our waste. The documentation process is to be carried out digitally, thus reducing our paper consumption. We implemented measures to reduce our staff's commuting distance, by deploying group transport and encouraging carpooling for instance. Geothermal energy is to be used for points heating on the line, instead of electric heating. We also figured out that several fewer substations than ProRail had initially considered necessary would actually suffice. The fact that these need not be built entails reduced use of materials and therefore lower costs. However, we also implemented measures designed to help the buildings alongside the track blend in better with the surroundings, for example by the application of green roofs."

**Jaap Balkenende indicated that there is a certain degree of conflict between the drive for innovation and the design regulations. Did you notice that?**

"Yes. The choice of sleepers is perhaps a good example of that. We proposed that steel sleepers be used. After all, it is a sustainable

material; when it comes to recycling it, you're only left with steel. You also require less ballast, while it requires less transportation capacity. Although trains abroad run at 200 kph on such lines, we in the Netherlands have no prior experience in that field. The idea was therefore rejected, which we consider rather a pity."

**Final conclusion?**

"That we are extremely pleased to have been awarded the contract. And that I view it as admirable - both personally and in a professional capacity - that a customer should actively encourage us to carefully consider the environmental repercussions of our actions."

The track bed is due for completion early in 2010. The first of the site huts have already been put up, while contractors' nameplates are also appearing. The noise barriers and the footings are currently being manufactured. The zero measurement can commence. Followed by the levelling. And just you wait and see how much quicker the trip from The Hague to Groningen will be in December 2012.

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Strukton Rail's contribution to safety and reliability involves systematic rail component status information, provided both to management organisations and to its internal operational disciplines. We work on the principle that up-to-date knowledge enables preventive action. The point is to keep one step ahead of breakdowns to maximise rail system availability.

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