

Mapping railways maintenance contracts – the case of Netherlands, Finland and UK

Jan-Eric Nilsson
Johan Nyström

Preface

This study is a sub project of a larger project at the Swedish Transport Administration (Trafikverket) that analyses the current contracts for rail maintenance in Sweden. Helena Eriksson is the project leader at the Swedish Transport Administration, with Björn Eklund and Johanna Laine acting as the contact persons for this study.

Stockholm, November 2014

Jan-Eric Nilsson and Johan Nyström

Process for quality review

Internal peer review was performed on 1 December 2014 by Anna Johansson. Johan Nyström has made alterations to the final manuscript of the report 2 December 2014. The research director Mattias Viklund examined and approved the report for publication on 4 December 2014. The conclusions and recommendations expressed are the authors' and do not necessarily reflect VTI's opinion as an authority.

Process för kvalitetsgranskning

Intern peer review har genomförts 1 december 2014 av Anna Johansson. Johan Nyström har genomfört justeringar av slutligt rapportmanus 2 december 2014. Forskningschef Mattias Viklund har därefter granskat och godkänt publikationen för publicering 4 december 2014. De slutsatser och rekommendationer som uttrycks är författarnas egna och speglar inte nödvändigtvis myndigheten VTI:s uppfattning.

Table of content

Summary	5
Sammanfattning	7
1 Introduction	11
2 Method.....	12
3 Rail maintenance markets	13
3.1 The Netherlands	13
3.2 Finland.....	16
3.3 United Kingdom – looking back	19
4 Summary, comparison and conclusion	22
4.1 Problem and discussion in the different countries.....	22
4.2 The way forward for the Swedish Transport Administration.....	23
References	24

Mapping railways maintenance contracts – the case of Netherlands, Finland and UK

by Jan-Erik Nilsson and Johan Nyström

The Swedish National Road and Transport Research Institute (VTI)

SE-581 95 Linköping

In 1988, Sweden was the first country in Europe to separate the ownership of railway infrastructure from traffic operations. Starting in 2002, maintenance has gradually been contracted out. Sweden, Finland and Holland – and previously England – have been in the European forefront regarding the use of competitive tendering of railway maintenance.

Both Finland and Sweden gradually introduced tendering of rail maintenance contracts. The Finnish Transport Agency is responsible for tendering contracts in Finland. An important difference to Sweden is the use of an organization that focuses on managing overall objectives etc., but not handling tendering and day-to-day management of contracts. Rather, technical consultants are contracted to handle responsibilities that are performed in-house by Sweden's Transport Administration. A benefit of the Finnish approach is that of a more executive process, creating a clear difference between formulating targets and implementing activities. This may reduce time from decision to action. On the other hand, the staff is not in-house, which can raise costs.

The Finnish contracts have a larger share of fixed pricing than in Sweden, making the contractor perform a greater portion of the assignment within the fixed amount established when the contract is signed. In contrast, the Swedish contracts have more work duties formulated as unit price contracts with adjustable and non-adjustable quantities. It is obvious that the Finnish contracts place more risk on the contractor than in Sweden. Both Sweden and Finland include bonuses and penalties in their contracts, but it is not obvious to which extent these focus contractors on the quality targets. Contract monitoring is very similar.

The Dutch contracts, competitively tendered since 2007, have taken steps towards performance contracting. This is an outspoken aim for the Nordic contracts as well but they have not yet come as far.

The Dutch agency, ProRail, quantifies reliability, availability, maintainability, safety, health and environment (RAMSHE) as a means for formulating functional standards that the contractor is supposed to meet based on a fixed price contracts. A separate third party is used for performance monitoring. The market consists of Strukton Rail, BAM Rail, Volker Rail and Asset Rail. Contracts today run for five years but are to be extended to ten years.

The combined separation of responsibilities and privatization in England came to an end in 2002. One reason was the Hatfield accident in 2000, which reinforced previous concerns over the quality of the network. Once Railtrack went bust and Network Rail took over, maintenance was transferred back and is now done in house. An important motive was a lack of monitoring, making Railtrack/NR unaware of the standard of the network.

The description of the situation in the countries indicate important similarities. All clients are trying to attract more contractors to place bids. At the same time, and very outspoken in Finland, the profitability on the market for rail maintenance is not high, making it difficult to attract new companies to enter the market.

Another common aspect concerns the allocation of risk between the parties, indicating different emphasis on fixed price and unit price contracts. A related dimension is the tradeoff between tendering input or output.

Kartläggning av drift- och underhållskontrakt på järnvägen – Nederländerna, Finland och Storbritannien

av Jan-Eric Nilsson och Johan Nyström
VTI, Statens väg- och transportforskningsinstitut
581 95 Linköping

Sammanfattning

Sedan 2002 har det svenska järnvägsunderhållet successivt konkurrensutsatts. De analyser som gjorts tyder på att detta sänkt kostnaderna med åtminstone 10 procent utan att försämra kvalitén på verksamheten (Odolinski och Smith 2014). Det kan, trots den goda utvecklingen, finnas ytterligare förbättringar att göra. För att belysa hur andra länder kontrakterar järnvägsunderhåll har Trafikverket gett VTI i uppdrag att kartlägga de kontrakt som används av Nederländerna och Finland och även i England innan återförstatligandet. Syftet med studien är att ge underlag inför Trafikverkets arbete med att vidareutveckla avtalen för de entreprenörer som genomför underhållsarbetet.

Studien baseras på intervjuer med erfarna personer hos beställaren ProRail i Nederländerna och det finska Trafikverket (Liikennevirasto). Intervjuerna har kompletterats med dokumentation som kontraktshandlingar, övrig dokumentation från beställarorganisationerna samt övriga studier i ämnet. Dessutom genomfördes ett seminarium i november 2014 med representanter för de två länderna samt med en presentation av vissa aspekter av de svenska kontrakten.

Beskrivningarna av marknadsförutsättningarna och kontrakten har granskats vid två tillfällen av respektive organisation för att säkerställa kvaliteten. Texten om Storbritannien är till stor del baserad på redan vunna kunskaper om den tidigare marknaden. Återgivelsen har granskats av kollegor på Institute for Transport Studies (ITS) i Leeds, UK.

Finland

I termer av marknadsinstitutioner ligger Finland närmast Sverige av de studerade länderna. Båda länderna började successivt upphandla järnvägsunderhåll ungefär samtidigt. En stor skillnad är att det finska Trafikverket har en relativt mindre organisation än Trafikverket. Finländarna har en mer management-orienterad organisation, som i större utsträckning nyttjar tekniska konsulter för att göra det beställarjobb som det svenska Trafikverket gör med egen personal. Det finska Trafikverket kan beskrivas som en mer renodlad beställare. Detta har både för- och nackdelar. Den positiva sidan kan vara att beslutsvägarna blir kortare och mer effektiva. Å andra sidan, personalen är inte in-house, vilket kan höja kostnaderna. Dessutom kommer kunskapen om kontrakten och dess utformning på armslängds avstånd från den ansvariga myndigheten.

De finska avtalen är utformade med ett fast pris. Eftersom en stor del av arbetet omfattas av den fasta ersättningen läggs mycket risk på entreprenörerna. Upplägget skiljer sig något från Sverige, där Trafikverket använder en större andel justerbara mängder för de utbetalningar som görs.

Vad som ska göras inom det fasta priset är en mix av funktionella och utförande krav. De funktionella beskrivningarna innefattar krav på punktlighet och spårlägen medan

utförandekrav exempelvis anger hur ofta gräset ska klippas. Man gör bedömningen att entreprenörerna inte har några problem med att räkna på de anbud som lämnas.

Både Sverige och Finland använder bonus och sanktioner. Den kontinuerliga uppföljningen av entreprenörernas arbete sker genom rapporterad självkontroll, information från tågoperatörerna och egen stickprovskontroll av beställaren.

För tillfället finns det två entreprenörer på marknaden, VR-Track och Destia med 8 respektive 4 kontrakt vardera. Kontrakten är fem år långa med en option på två.

Nederländerna

Järnvägsunderhåll i Holland har upphandlats i konkurrens sedan 2007. Innan dess skötte tre utvalda bolag järnvägsunderhållet under en period av tio år. Detta gjorde det möjligt att fördjupa förståelsen av hur kontraktsumformningen påverkar entreprenörernas agerande och därmed också kostnader och kvalitet.

De holländska kontrakten skiljer sig väsentligt från den svenska och finska genom att i större omfattning specificera funktionella krav. ProRail operationaliserar begreppen tillförlitlighet, tillgänglighet, underhållsmässighet, säkerhet, hälsa och miljö (RAMSHE) i syfte att specificera de funktionella termer som de vill att entreprenören ska uppnå. Entreprenören räknar sedan på dessa krav och avger ett fast pris för att upprätthålla kravnivån. Inga mängder eller enhetspriser används.

Kontrollen av att entreprenörerna levererar den funktion som avtalats utförs av en separat tredje part. Marknaden består av Strukton Rail, BAM Rail, Volker Rail och Asset Rail. Marknadsandelarna fördelar sig på ungefär 40 procent för Strukton och 20 procent vardera för de andra företagen. Kontrakten är på fem år, men ska förlängas till tio år pga. höga kostnader för att ta fram upphandlingsdokumenten.

UK

Sedan 2002 äger Network Rail spåren i Storbritannien och utför allt underhåll i egen regi. Vissa reinvesteringar upphandlas. Tidigare fanns det dock en marknad för järnvägsunderhåll. År 1993 separerades trafiken och infrastrukturen i Storbritannien. Det inkluderade även en vertikal separation av drift och underhåll. Railtrack bildades 1994 som ett privat företag, med ansvar för att äga järnvägsinfrastruktur (spår, signalering och stationer) och även upphandla underhållet.

Inledningsvis efter privatiseringen nyttjade Railtrack ett kontrakt för underhåll som utgick från att det fanns stora kostnadseffektiviseringar att göra. Mot en fast summa räknade man ner ersättningen med 3 procent per år. Utan ordentlig uppföljning och styrning framkom det snart stora problem i den levererade kvaliteten på underhållet. Man gick då över till en kontraktsmodell (IMC 2000) med ersättning för allt arbete som gjordes men med ett tak på ersättningen. Därtill upprättades en så kallad "alliance board" med beställare och utförare för att tillsammans besluta om vad som skulle göras i kontraktet. Railtrack tog även tag i att börja följa upp kostnaderna och kvaliteten på banan. Allt detta arbete avslutades 2002, när drift och underhåll av järnvägen återreglerades.

Jämförelse

Tabellen nedan sammanfattar några egenskaper hos de avtal som styr underhållskontrakten i de olika länderna. Exempelvis har Finland en mindre mer renodlad

beställarorganisation som också upphandlar delar av de beställaruppgifter som i Sverige genomförs av Trafikverket.

Den mest centrala skillnaden ligger i användningen av funktionskrav i stället för krav på vilka aktiviteter som ska genomföras. Holländarna har kommit långt i sitt arbete med att utveckla funktionskrav. Utmaningen i detta ligger i att specificera funktionella krav som med stor sannolikhet innebär att beställaren får den önskade kvalitén utan att i detalj behöva reglera *hur* detta ska göras. Det innebär exempelvis att kravet på ett visst antal inspektioner av rälsskarvar släpps eller specifikationen av åtgärder för att byta och följa upp ett växelbyte inte finns annat än som en rekommendation. Istället fokuserar man på exempelvis punktlighet.

Tabell 1: Sammanfattande jämförelse

	Beställare	Antal km spår (ca)	Konkurrens-utsatt sedan	Kontraktens längd	Antal kontrakt	Antal entreprenörer med kontrakt	Genomsnittlig kontraktsstorlek (euro per år)	Typ av krav i kontrakten
Nederländerna	ProRail	7 000	2007	5 år (snart ändrat till 10år)	19	4	7 000 000	Funktionskrav
Finland	Trafikverket (Liikennevirasto)	6 000	2003	5+2 år	12	2	5 000 000	Mix av funktion och utförande
UK	Network Rail (Rail Track)	16 000	1992–2002					
Sverige	Trafikverket	1 000	2002	5+2	33	5	6 000 000	Primärt utförande

Något som inte är särskilt diversifierat mellan de olika länderna är vilka problem som diskuteras. Både i Finland och i Nederländerna diskuteras hur fler entreprenörer kan lockas till marknaden för att stärka konkurrensen. Därutöver talas det om hur man ska väga mellan mer tid i spåren för arbete och tågens framkomlighet. En utmaning är också att locka unga människor till branschen.

Vägen framåt

Även om Nederländerna kommit långt med sina funktionskontrakt och finländarna har en mer slimmad organisation, så har föreliggande studie inte analyserat huruvida detta är att föredra gentemot den svenska utformningen.

Däremot kan Trafikverkets nuvarande inriktning tolkas som att organisationen jobbar i dessa riktningar. Det är mycket tal både om att renodla beställarrollen och att i ökad omfattning använda funktionskontrakt. Givet en sådan inriktning finns det erfarenheter att hämta från Finland och Nederländerna.

1 Introduction

Since 2010 The Swedish Transport Administration (Trafikverket) is responsible for the rail infrastructure in Sweden. Starting in 2002, the agency has gradually gone from in-house production of railway maintenance to competitive tendering of maintenance contracts. Odolinski and Smith (2014) have shown, with a unique set of data, that competitive tendering has reduced costs by around 12 percent without reduction of quality. The latter has been measured by track quality class, track geometry or train derailments.

Despite this positive effect of the reform, there is still room for improvement of the contracts design. Trafikverket has initiated a project in order to find the optimal contract for railway maintenance.

One part of this assignment is to describe the design of maintenance contracts in other countries in order to identify features that may be worthwhile using in Sweden as well. VTI got the assignment to prepare a background report for this part of the project. The purpose of this study is to describe the tendering process and railway contracts in Finland and Holland, but also how the UK designed their contracts during the period where maintenance was contracted out. The Spanish rail infrastructure owner Adif has also contracted out some of their maintenance, but that is not included in the study.

Chapter 3 describes the development of the current market for rail maintenance in Finland and Holland and gives a review of the earlier situation in the UK. Chapter 4 summarizes and reflects on these markets.

2 Method

The main source of information for this paper is interviews. Interviews have been conducted with initiated people at Prorail (Holland) and The Finnish Transport Agency. All respondents have long experience of their respective countries' first steps towards opening up the rail maintenance market for competitive tendering.

The information from the interviews has been completed with documentation such as contracts and information from Prorail, The Finnish Transport Agency but also studies of the rail maintenance markets.

All of the text has been reviewed by the interviewed people.

The information about the UK has been drawn from other studies of our own, our own knowledge and colleagues at the Institute for Transport Studies (ITS), University of Leeds.

3 Rail maintenance markets

The first European country to abandon the monopoly on rail maintenance was the UK in 1993. Since then other countries have followed. This section describes how Holland and Finland have gone from a monopolized rail maintenance market to a competitive tendering of these contracts. The UK market was re-nationalized after some years of tendering, but some features of these contracts is also described.

3.1 The Netherlands

The first railway in the Netherlands opened in 1836 between Amsterdam and Haarlem. This construction was commissioned by the state, i.e. King William I (Veenendaal, 2001). The construction and traffic on the line was provided by the private company Hollandsche Ijzeren Spoorweg-Maatschappij (HSM). King William also secured funding for the second rail line between Amsterdam and Arnhem in 1843. This line was built and operated by Nederlandse Rhijnspoorweg-Maatschappij (NRS). After that private investments in new lines stopped and the government took over the initiative to build the network, but exploitation was left over to private companies.

In 1938 the two private firms HSM and NRS's successor Maatschappij tot Exploitatie van Staatsspoorwegen (SS) merged into the state-owned Nederlandse Spoorwegen (NS). NS was responsible for both train operation and the infrastructure until 1996. That year there was a separation of the tracks and the traffic, with the subsidiary NS Railinfratrust (NSR) in charge of the infrastructure. Although NSR was a separated organisation, it was still a part of NS until 2003. NS is today the largest train operator in the Netherlands.

In 1997, 2800 NS employees were divided into three new companies: Strukton, Volker Stevin and NBM Rail. All three companies were able to undertake rail maintenance and reinvestments (Swier, 2007).

ProRail was then created in 2003, fully independent from NSR. It was assigned to take on the management role in tendering rail maintenance, renewals, building, traffic control and capacity management.

3.1.1 The market

The Dutch railway comprises almost 3000 km of line (approx. 7000 km track), 90 percent of which is electrified. Originally the market consisted of 39 maintenance areas, which has been reduced to 19, see figure 1.

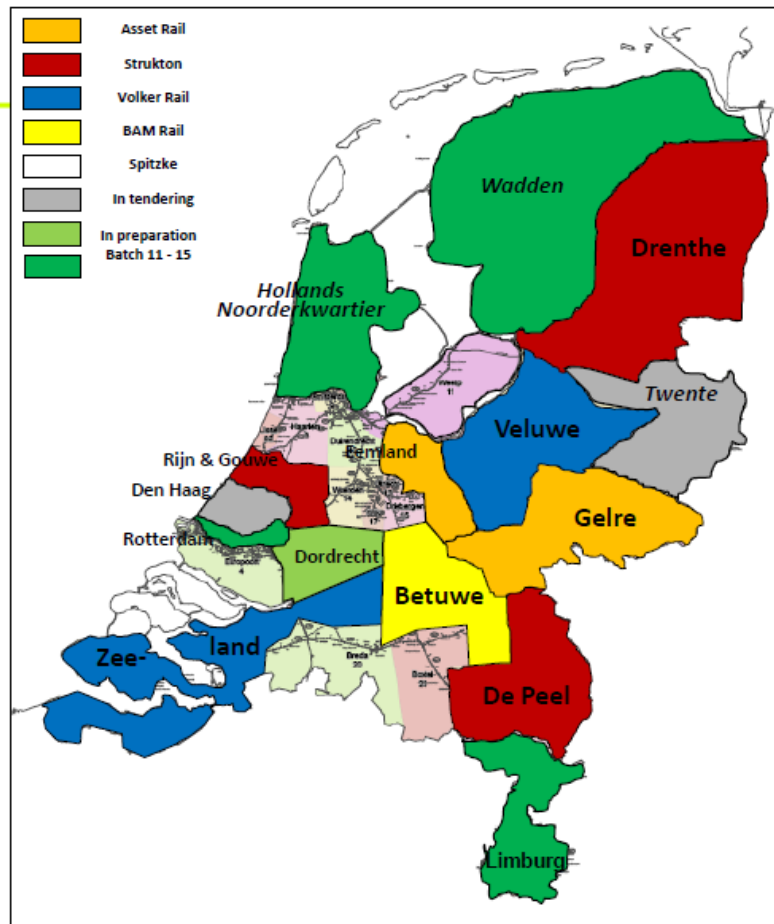


Figure 1 The rail maintenance areas in the Netherlands. Source: ProRail.

As mentioned above Strukton, Volker Stevin and NBM Rail have been active since 1997 but it was not until 2007 that the rail maintenance contracts were competitively tendered.

Today, there are four contractors, Strukton Rail, BAM Rail, Volker Rail and Asset Rail, in the market. German based Spitzke has prequalified to submit bids but has not done so yet. The average sum of each contract is approximately 7 million euros per year.

3.1.2 The contracts

Even though the first competitive tendering did not take place until 2007, ProRail had been developing their contracts since 1998 in collaboration with the incumbent contractors. There was an early thought to steer the contractors by performance standards in contrast to prescriptive documents. ProRail made the distinction between input and output specifications, originally intending only to use the latter (Swier, 2007). However, the early internal agreements¹ between the parties were not based on output specifications. Instead ProRail have gradually moved towards such contracts by developing specifications, monitoring systems, work order systems, risk management tools, etc, etc.

¹ These could not be seen as real contracts since they were lacking in structure and were not procured.

The basic approach in ProRail's contracting is based on a so-called specification triangle; cf. figure 2. This encompasses three different levels of specifications, where the highest pinpoints what the contract shall deliver in terms of quality. These are expressed as high level aims. The second level contains technical measurements in order to achieve the quality of the systems in terms of technical parameters. The third level describes the minimum technical specifications that are required to fulfill the minimum acceptable technical quality. Below this, at the fourth level, are activities to be performed.

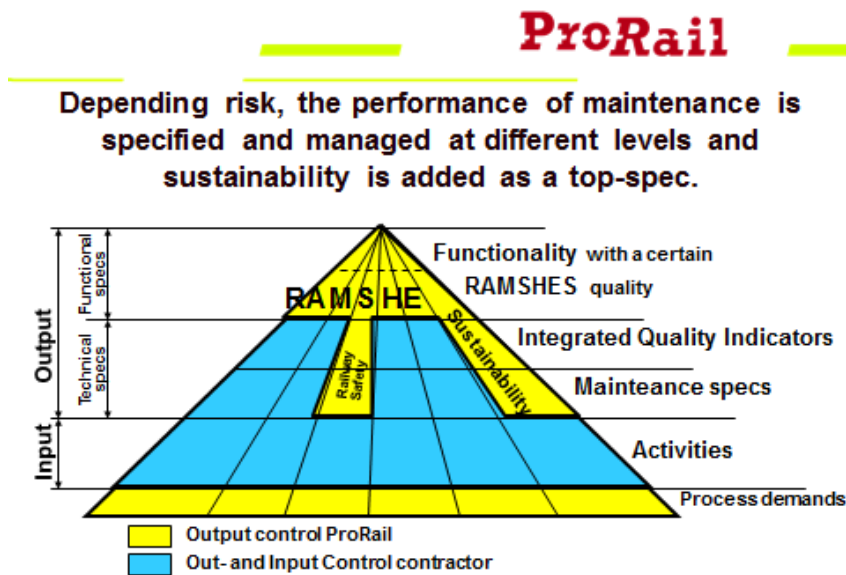


Figure 2 The specification triangle. Source: ProRail

An input contract would only stipulate fourth level specifications, while an output (or performance) contract is based on the three levels of quality specifications above it. Hence, the logic of the model is that activities (4th level) fulfill the technical specification (3rd level) that satisfies the quality (1st / 2nd level).

An example is e.g. a goal of railway safety (1st level). In order to ensure this quality level, a technical specification of minimum standard for track width (3rd) is used in the contract. As long as the contractor is above this, the contract requirements are upheld. Hence, this is regulated in the contract on a 3rd level specification, and then it is up to the contractor to do the activities (4th level) in order to fulfill the contract.

An important part of the contracts concerns risk management. Analyses of how the third level - technical specifications (i.e. level of track geometry) - affects the probability of quality levels (e.g. punctuality or safety) by using data from older contracts provides the basis for the risk analysis.

The quality dimensions adapted in the Dutch rail maintenance contracts are referred to as RAMSHE. This stands for Reliability, Availability, Maintainability, Safety, Health and Environment.

Having gone from steering the incumbent contractor with 4th level activity specifications, ProRail nowadays only work with contract specifications of the first,

second and third level. RAMSHE is managed on the 1st level and Safety on the 2nd and 3rd level.

These so-called “PGO-contracts” are fixed price performance contracts without any payment based on unit prices and quantities. This fixed price includes all material. There are bonus and penalties for not complying with the contracts requirements regarding e.g. safety matters, speed reductions, exceeding time on track.

The contracts run for five years and include all track and switches, power supply, signaling, overhead wire, civil structures, telecom (Booij and Boer, 2013). Duration of the contracts is about to change from 5 to 10 years, due to high client costs for preparing the tendering documents.

Monitoring of the contracts is done by the contractors themselves, third party inspections and controls by the client.

3.1.3 Current topics of discussion

- Is the market big enough for more contractors?
- Time in track for the contractors.

3.2 Finland

The history of Finnish rail transportation dates back to 1862. Governmental Suomen Valtion Rautatiet was responsible for both infrastructure and traffic. This institutional setting was then intact for 133 years. In 1995 there was a separation of rail infrastructure management and train operations. The Finnish Rail Administration (RHK) was founded to take responsibility for the infrastructure. Suomen Valtion Rautatiet turned into the still state-owned VR Group, which operated the traffic. VR Track was also founded within the VR Group. Until 2005 all track maintenance was bought straight from VR Track. Between 2005 and 2013 all 12 track maintenance areas and 4 electrification areas were gradually exposed to competitive tendering.

In 2010 the new Finnish Transport Agency (FTA) was formed (Leviäkangas, 2011). The new agency gathered the infrastructure ownership of road, rail and maritime under the same roof. FTA gave new impetus for trying to create a market for rail maintenance, which was started already before the first tendering.

3.2.1 The market

The Finnish rail infrastructure includes almost 6 000 km of railway with the wider old Russian track gauge (1524 mm). About half of the tracks are electrified, which constitute about 90 percent of the traffic. Until 2005 all rail maintenance in Finland was carried out by VR-Track. This monopoly was broken gradually between 2005 and 2013. Destia, the former state owned road maintenance company won one of the first contracts. The private companies Eltel Networks and Veli Hhyryläinen were also early on the market. Both of them were later bought by Destia. Destia was bought by Ahlstrom Capital in 2014.

The market is made up of two contractors, VR Track and Destia Rail. Out of the 12 maintenance areas, Destia Rail has 4 and VR Track 8, see figure 3 (Levomäki, 2013). The average sum for a rail maintenance contract per year is approximately 5 million euros. Some efforts have been made to attract new contractors to the market, which has shown some interest. Also maintenance of electricity installations is performed by two companies, VR Track with two contracts and Eltel Networks that holds the other two.

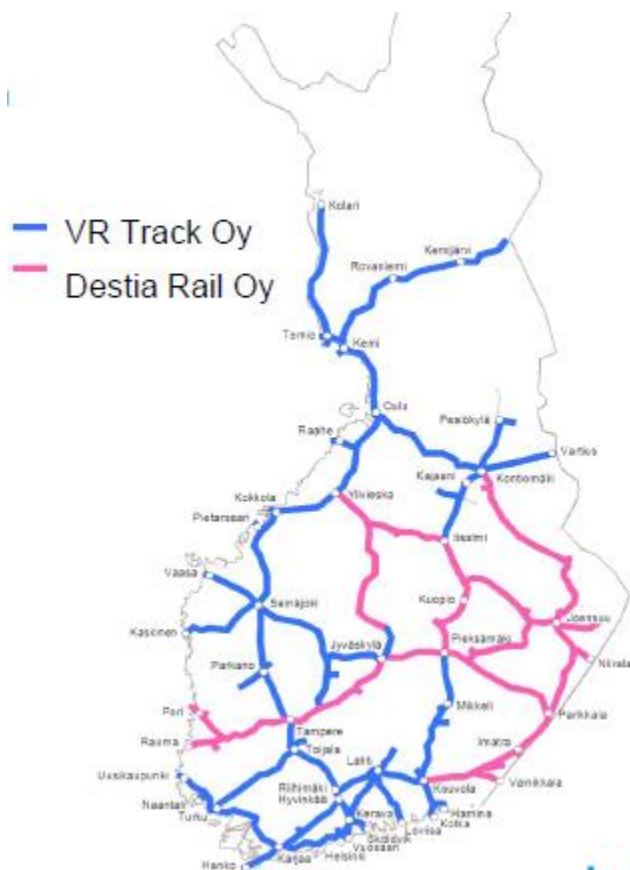


Figure 3 Rail maintenance contracts in Finland (situation 2013).

The Finnish Transport Agency has a strong focus on management. Apart from tendering all maintenance services, the traditional duties of a client are also procured. These include the preparation of the procurement and contracts, contract monitoring, being responsible for handling day-to-day duties of the client etc.

The department with responsibility for rail maintenance involves 15 people. Of these, four project managers are responsible for railway maintenance contracts and one for electrification contracts. Each project manager has one assistant manager and about 10 consultants per contract.

3.2.2 The contracts

Bidding process takes place in two stages. The first means that the client grades the quality of each bid and the contractors' organization. This is measured on soft quality parameters, where the contractors describe their competence, how to solve problems, quality systems etc.

The quality evaluation is made before the second stage in which the price of the tender is revealed. Both the price and the quality level of the bid are evaluated in a predetermined manner, to find the winning contractor. The standard is to base the identification of the winning bid on 35 percent quality and 65 percent price. The contracts run for five years plus an option of two years. These contracts include routine

maintenance of tracks, signaling and (on some contracts also) the platforms. Reinvestments and electrical work are procured separately.

The payment scheme of the contract can be described as having three parts. First a monthly fixed amount, then a variable amount that the client orders and finally a bonus/penalty section of the contract.

The fixed monthly payment emanates from the contractor's bid. This is based on a mixture of functional requirements and prescriptive works. Functional terms in the contract stipulate a maximum of delayed trains and a minimum of gauge track, that the contractor need to fulfill. Prescriptive requirements include how many times vegetation should be cleared each year. The levels of both the functional and prescriptive requirement components, differ for different parts of the system depending on maintenance level, meaning that higher standards are required for tracks with more traffic.

The logic of the contract is that the required level should be fulfilled by the fixed amount that the contractor offers in the bid. Whether a delay is due to substandard maintenance or something else is sometimes discussed but the client does not consider it a big issue. There is also a fee for the train operator if it is their fault. Hence, the monthly pay requires the contractor to fulfill the functional requirements but also do the predetermined work. Winter maintenance is included in this fixed amount.

In addition to this fixed amount, there is another part of the contract with estimated additional work. These are activities that the client will order separately and the contractor will get paid for by predetermined unit prices. The total sum of the estimated additional work is a rather small share of the whole contract and there is no guaranteed work. The unit prices and estimated quantities are added to the fixed price when comparing the bids in the tendering process, but they are not included in the contracts.

Most materials, except special equipment such as rails, signaling parts and metal parts for switches, have to be paid for by the fixed price component. Finally bonuses and penalties are paid for e.g. upholding train punctuality as a percentage figure and if errors are not taken care of within a specific time frame. In conclusion the Finnish railway maintenance contracts are mainly to be characterized as fixed price contracts. Some of the payment is based on a cost plus structure, with variable quantities and unit prices, but the bulk of the payment is fixed. This requires the contractor to take on most of the risk. This means that if the infrastructure turns out to be of substandard quality in comparison to what has been described in the tendering process or if the contractor misinterprets the information, it is up to the contractor to take on enhanced cost upholding the maximum of delayed trains and minimum of gauge track within the fixed amount.

The monitoring of the contracts works in three ways. First, it is stipulated in the contract that the contractor should monitor themselves and report to the client. Secondly, the client's area manager and the consultants make their own inspections. Finally, the traffic operators report problems on the railway. In addition, track geometry measurements are made by a third party.

There are discussions between the client and the contractor regarding the description of the infrastructure in the tendering documents. This discussion usually takes place before the contract is signed.

Current topics of discussion in Finland

- Get young people interested in the sector
- Attract more contractors to the market
- Too low prices, which affects the quality

3.3 United Kingdom – looking back

The British railway is said to be the oldest in the world. In 1821, the British government sanctioned the construction of a line between Stockton and Darlington. Today the railway system in UK consists of almost 16 000 kilometers, of which 40 percent are electrified. The electrified track carries 60 percent of the traffic.

Since 2002 Network Rail owns the tracks in the UK and carries out all maintenance in-house. However, most reinvestments are still tendered. But there is a history of the British railway system being contracted out. This started in 1993, when British Rail (BR) was broken up in its component parts.

The following section is a description of the UK rail market between 1993 and 2002.

3.3.1 The UK market and contracts 1993-2002

UK's traffic was separated from infrastructure in 1993. This also included a vertical separation of maintenance from the infrastructure owner, Railtrack, which was formed in 1994 as a private company to own the rail infrastructure (tracks, signaling and stations).

Maintenance was contracted out to a number of companies.² It was assumed that private sector discipline would produce efficiency savings. The (initial) five-year contracts worked as a fixed price based on the winning bid with an annual reduction of the payment by 3 percent, reflecting the expected scope for cost reductions

The former BR organization's was regarded to be inefficient. Railtrack in essence assumed that the now independent units would carry on doing the same job, to the same standards as before, with minimum interference from the client. In effect, Railtrack entirely handed over responsibility for its infrastructure to its contractors.

In 1997, Railtrack had lost control of the quality of its infrastructure. The contracts with their year on year cost reductions, combined with the increase in train miles, which should have triggered extra maintenance payments but did not, were affecting track quality. Railtrack therefore started to consider the future of its maintenance contracts. First, the original contracts were replaced when they were to be re-tendered, with the new Infrastructure Maintenance Contracts 2000 (IMC 2000). These attempted to give greater certainty to both parties.

The IMC 2000 contract is a cost reimbursable form of contract set against either a target or a guaranteed maximum price. Railtrack's intention was to provide a platform for the improvement of the quality and efficiency of maintenance. The use of a cost reimbursable contract, and the introduction of provisional allowances for maintenance works (referred to as complementary works), were intended to improve the contractor's

² "Railtrack nurtures its grass roots." Roger Ford describes moves afoot to improve maintenance practices on Railtrack's Eastern Region. March 2002

incentives to identify and carry out the maintenance work in a way that complies with infrastructure standards and to provide a safe, reliable railway.

Furthermore, the recording of actual cost was intended to provide improved visibility of the cost of maintaining the rail infrastructure. In this way, it would be easier to enable improvements in the targeting and methods of carrying out maintenance by Railtrack and its contractors.

In parallel, Railtrack sought to re-integrate the contractors with the railway business through “Alliance Boards” made up of representatives of Railtrack and the contractors involved in a project. In theory, all would agree on what had to be done. If things went wrong, all shared the consequences.

Alliances seem to have worked, although with varying degrees of harmony and success. But contractually Railtrack still didn’t have so much more control of what was done and how than before. In addition, asset knowledge rested predominantly with the contractor.

The Rail Regulator became concerned with Railtrack’s combination of deteriorating track quality and soaring costs. Railtrack was therefore required to produce an Asset Register as the first step, and then to “populate” this register with the condition of each asset. After all, there is no point in knowing you have 20 miles of track somewhere if you don’t also know whether it was re-laid last week and is in prime condition or has a 20 mph “condition of track” speed limit imposed. The contractor on spot may know, but how could Railtrack’s managers make sensible engineering, let alone budgetary, decisions?

On top of this, track maintenance needed access, which meant having possessions. Longer possessions meant more disruption to Railtrack’s customers, but this could be traded off against greater efficiency if you knew what work needed to be done and when.

When infrastructure work was invoiced, there was no quick and effective way of checking that the work had been done. Because of the attention given by the Regulator of these features, the work provided by a working group greasing a switch and crossing had to be entered into the MIMS (Mincom Information Management System) asset register. When the invoice came in, the work listed would be checked against MIMS. If the latest attention to the switch and crossing were not there, the invoice would not have been paid. Railtrack also decided to implement the use of MIMS for asset management. This was to be used in conjunction with the asset databases to improve Railtrack’s understanding, planning and management of its infrastructure asset maintenance.

In order to get infrastructure condition back under control, the Ten Engineering Principles were established:

1. Take responsibility for material asset engineering decisions.
2. Deliver clear asset engineering policies, standards, specifications and key work instructions.
3. Own asset information including asset condition data and monitoring.
4. Own examination of the network and, on a long-term basis, aim to automate inspection.
5. Own the work prioritization decisions and the resulting work plans on planned and reactive maintenance.
6. Be accountable for developing the long-term view of people and capability required and work with the industry to ensure the people are developed as necessary.

7. Lead the industry R&D into plant, systems, process and materials.
8. Consult passengers and freight operators and trade off access to the network based on assessed risk against a risk matrix.
9. Be able to demonstrate cost effectiveness on maintenance and renewals, and seek continual unit cost reductions to meet regulatory expectations of efficiency
10. Continue to contract out maintenance and renewals but consider the merits of bringing this work in-house for one or two “control areas”.

The IMC 2000 contract payment conditions were changed in the Midlands Zone, from the guaranteed maximum price, which applied in other IMC 2000 contracts areas, to a target cost. The key difference was that the target cost arrangements resulted in Railtrack taking a share of any overrun of actual costs as well as a share of the benefits if actual costs were below the target.

The contracts contained provisions for the contractor to populate and maintain the Railtrack Asset Register (RAR), which was the database, together with GEOGIS (Geography and Infrastructure System) which would contain information on the physical location, condition and other characteristics of all Railtrack’s operational assets.

All this work with developing the contracts came to an end when the government decided that Network Rail would buy Railtrack in 2002. This meant that the state once again would own the railway tracks and that maintenance were carried out by their own staff instead of a private company.

4 Summary, comparison and conclusion

Sweden was the first country in Europe to separate the ownership of infrastructure and traffic operations in 1988. Maintenance has been gradually contracted out since 2002. Hence, Sweden together with the other countries in this study has been in the European forefront regarding a more market oriented railway system.

Closest, in terms of market institutions, to the Swedish situation is Finland. Both countries started gradually contracting out rail maintenance at about the same time. This is in stark contrast with the UK big bang of 1993-94.

Currently both markets for track and electricity maintenance in Finland include the Finnish contractor VR Track. A big difference as compared to Sweden is that the Finnish client has a slimmer organization than its Swedish counterpart. The Finnish Transport Agency is more of a management oriented organization, focusing on managing and not doing. They have employed a lot of technical consultants to do the job that the Swedish Transport Administration do in-house. This has both pros and cons. The positive side is that such an arrangement has the potential of a more executive process with shorter time from decision to action, as the organization is more streamlined. On the other hand, the staff is not in-house, which can raise costs.

The Finnish contracts put more risk on the contractor than the Swedish, due to the fixed price. A greater portion of the work is to be completed within the fixed amount, whereas the Swedish contracts have more work as adjustable quantities. The latter payment scheme used in Sweden provides the client with the risk. The Finnish contracts include some adjustable quantities but not to the same extent. Both Sweden and Finland include bonus and penalties. The monitoring of the contracts is very similar in both countries.

Rail maintenance in Holland has been tendered in competition since 2007. The Dutch contracts differ from the Swedish and the Finnish, as they have come further towards performance contracting. This is an outspoken aim for the Nordic contracts as well but they have not come as far.

ProRail uses reliability, availability, maintainability, safety, health and environment (RAMSHE) in order to specify the functional terms that they want the contractor to achieve. These specifications are then to be upheld by the contractor providing rail maintenance within a fixed price. No quantities or unit prices are used in these contracts. As always, things can be improved but all in all, the performance contract is working well.

Monitoring of the contracts is to a large extent made by a separate third party. The market consists of Strukton Rail, BAM Rail, Volker Rail and Asset Rail. Contracts today run for five years but are to be extended to ten years.

For a number of reasons, the extreme separation of activities and privatization in England came to an end in 2002. This was prompted by the Hatfield accident in 2000, which indicated renewed concerns about the quality of the network. Once Railtrack went bust and Network Rail took over, it seemed that maintenance should then come in-house, as failures of the contractors and the relationship between contractors and NR and implications for asset knowledge etc, was a key source of the problems.

4.1 Problem and discussion in the different countries

One conclusion of this study is that the discussions in the different countries coincide.

All clients are trying to attract more contractors to place bids on their national market. At the same time, very outspoken in Finland, the profitability on the market for rail maintenance is not high. It might be hard to attract new companies to enter the market under such circumstances.

Another, theoretical issue that can be raised, is how many contracts that a relative small market, such as railway maintenance, can contain? An issue often discussed, that goes hand in hand with the first one, is how to attract new young people to this profession.

4.2 The way forward for the Swedish Transport Administration

This study does not address the cost efficiency aspect of the different countries contracting forms. Still with Trafikverket's current focus on becoming a more management oriented client and using more functional contracting, there are more to be learned from Finland and the Netherlands, respectively.

References

Booij, P and Boer, R (2013) Developments in outsourcing maintenance in the Netherlands.

Leviäkangas, P., Nokkala, M., Rönty, J., Talvitie, A., Pakkala, P., Haapasalo, H., Herrala, M. and Finnilä, K. (2011), "Ownership and governance of Finnish infrastructure networks", VTT Publications 777, VTT Technical Research Centre of Finland, Espoo

Levomäki, M (2013) Railway Maintenance in Finland

Odolinski, K and Smith, A (2014) Assessing the cost impact of competitive tendering in rail infrastructure maintenance services: evidence from the Swedish reforms (1999-2011). CTS Working Paper 2014:17

Swier, J. (2007) The history of outsourcing rail infrastructure maintenance in the Netherlands.

Veenendaal, A (2001) Railways in the Netherlands: A Brief History, 1834-1994. Stanford University Press

VTI, Statens väg- och transportforskningsinstitut, är ett oberoende och internationellt framstående forskningsinstitut inom transportsektorn. Huvuduppgiften är att bedriva forskning och utveckling kring infrastruktur, trafik och transporter. Kvalitetssystemet och miljöledningssystemet är ISO-certifierat enligt ISO 9001 respektive 14001. Vissa provningsmetoder är dessutom ackrediterade av Swedac. VTI har omkring 200 medarbetare och finns i Linköping (huvudkontor), Stockholm, Göteborg, Borlänge och Lund.

The Swedish National Road and Transport Research Institute (VTI), is an independent and internationally prominent research institute in the transport sector. Its principal task is to conduct research and development related to infrastructure, traffic and transport. The institute holds the quality management systems certificate ISO 9001 and the environmental management systems certificate ISO 14001. Some of its test methods are also certified by Swedac. VTI has about 200 employees and is located in Linköping (head office), Stockholm, Gothenburg, Borlänge and Lund.



HUVUDKONTOR/HEAD OFFICE
LINKÖPING
POST/MAIL SE-581 95 LINKÖPING
TEL +46(0)13 20 40 00
www.vti.se

BORLÄNGE
POST/MAIL BOX 92
SE-721 29 BORLÄNGE
TEL +46(0)243 446 860
www.vti.se

STOCKHOLM
POST/MAIL BOX 55685
SE-102 15 STOCKHOLM
TEL +46(0)8 555 770 20
www.vti.se

GÖTEBORG
POST/MAIL BOX 8072
SE-402 78 GÖTEBORG
TEL +46(0)31 750 26 00
www.vti.se

LUND
POST/MAIL Medicon Village
SE-223 81 LUND
TEL +46(0)46 540 75 00
www.vti.se