

CONTRACTING OUT WINTER MAINTENANCE OPERATIONS - FINNISH EXPERIENCES

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1. Abstract

The Finnish National Road Administration (Finnra) is responsible for 77,900 km of public roads in Finland. The public road network includes main roads (13,300 km), regional roads (37,000 km) and also local gravel roads (27,600 km).

Winter conditions prevail in the Finnish road network for almost half a year. The 40-100 cm snow cover coats the landscape for 4 to 6 months. On the narrow coastal strip by the Baltic Sea the winter is shorter and the snow melts several times during the winter.

During the wintertime Finnra is responsible:

- for assuring a smooth traffic flow on all public roads, every day, round the clock
- for ensuring and enhancing traffic safety
- for minimising harmful effects on the environment.

In recent years Finnra's state agency organisation () side has developed a concept for contracting out all maintenance work, including winter maintenance. Initially the concept was tested and implemented inside the Finnra organisation, where both client and producer organisations were separated from each other but were still under the same managing board and director general. The producer side of Finnra constituted the other contracting party and was responsible for carrying out all maintenance work in accordance with the contract documents.

The second step in developing the concept was to test and implement it on the Finnish civil engineering market. The Finnra agency organisation arranged an invitation for bids on a pilot basis of selected regional areas of the public road network. Private companies, as well as the producer side of Finnra, competed for these pilot contracts. The contractors were chosen on an invitation to bid basis.

A new statute on the restructuring of Finnra has been approved by the Finnish Parliament in 2001. At the beginning of 2001 Finnra was divided into two different organisations, namely (a) the client organisation, i.e. the Finnish Road Administration, which is a state agency organisation, and (b) the production organisation, i.e. Finnish Road Enterprise, which is a state owned enterprise.

Making use of its previous experiences, in 2001 Finnra introduced a maintenance scheme based on open and unrestricted competition which would progressively be expanded.

During the four-year transition phase all maintenance work on Finnish public roads will be gradually opened up to unrestricted competition. Following this phase the new state owned enterprise and private contractors will operate in an openly competitive situation in the field of civil engineering.

2. The organisation's own work on public roads has been contracted out since the 1960s.

The Finnish National Road Administration (Finnra) has been a state organisation operating under the auspices of the Ministry of Transport and Communications which has itself planned, constructed and maintained the public roads.

During the 1960s, when Finland's main road network was being constructed, the organisation started to employ private contractors on a larger scale for road construction. Road maintenance was carried out mainly by Finnra itself. During the 1970s comparisons between the price levels of the organisation's own work and that of independent contractors were made by Finnra and this led to the increasingly common use of private enterprise for road construction, and also to a small extent for road maintenance. Finnra awarded private lorry owners contracts for winter routine maintenance consisting mainly of snow clearance on a price per kilometre basis. In addition, in many cases the contractor was loaned a snow plough owned by Finnra. Winter routine maintenance contracts applied to one winter period only and the sole criterion when selecting the contractor was the price per kilometre quoted in the tenders received.

During the 1980s the use of contractors was again increased because, according to a survey by Finnra, both construction and maintenance work were cheaper than Finnra's when carried out by a private contractor. Contracting applied in particular to road construction. In winter routine maintenance the work was increased, so that in addition to snow clearance it now included gritting and salting. However, the form of contract for such work and the payment basis remained unchanged. The contractors were small owners of just a few machines and when choosing a contractor the price charged per kilometre was still the governing factor. In many cases, the contractor was loaned one of Finnra's snow ploughs and some grit spreaders and the grit or salt the contractor spread on the roads was Finnra's property. The usual custom was for the contractor to be entrusted with the task of routine maintenance on lower class roads, while Finnra's equipment handled the winter maintenance work on the busier roads. With the increased use of private enterprise, Finnra reduced its own road maintenance equipment and its own maintenance personnel. Despite the increase in contracting, however, only 10% of the routine maintenance work was carried out under contract.

As a result of the rationalisation of operations, the improved efficiency of maintenance machine work, and the number of outside contracts, Finnra's own workforce decreased from 22,000 at the beginning of the 1970s to around 10,000 at the beginning of 1990. Simultaneously, Finnra reduced its own stock of maintenance equipment, lorries and road graders. However, along with increases in the efficiency and capacity of the maintenance equipment, the transportation capacity of the lorries among other things also increased.

3. Reorganisation of Finnra organisation in the 1990s

The 1990s were a time of rapid changes in regard to the organisation of Finnra. In Finland's administrative system a large number of State authority type production organisations were turned into commercial enterprises which were at first State-owned but were later privatised. Where the Ministry of Transport and Communications' administration was concerned this change affected the Post and Telecommunications of Finland, the Finnish State Railways (VR), the National Board of Aviation (Civil Aviation Authority), and the heavy machinery repair work within the Finnish Road Administration.

In 1993 a start was also made on the preparatory work for the division of the Finnish Road Administration into two organisations, namely the Road Administration and a production organisation, Finnish Road Enterprise. The groundwork for the change took a long time and the division to a large extent was a political one. Even after the prolonged preparatory phase there was no political consensus in regard to splitting the Road Administration into two separate organisations. Nevertheless, at the

beginning of 1998 the Road Administration was reorganised, with an internal division into two parts, the Road Administration and a production division responsible for the actual road maintenance work, Finnish Road Enterprise. These organisations operate independently but under the control of the same executive board and director general.

4. Arranging an invitation for bids for public road routine maintenance on a pilot basis

4.1 The Road Administration's preparations

The Road Administration's task was to lay the foundations for purchasing planning, construction and maintenance services from suppliers in the sector as comprehensive services. In each project the supplier would accept full liability for the project. The previous practice in construction and especially maintenance had been the purchasing of only part-services or the performance of work.

In regard to maintenance in particular this meant creating new markets and obtaining permanent suppliers able to offer a full service. New operating methods were developed and a decision taken to test these in certain pilot projects.

For developing maintenance contracting procedures the following factors were defined and approved:

- The recommended lengths of the road network in regional maintenance contracts and the duration of the contracts
- The evaluation criteria for selecting the best contractors; the prequalifications of contractors
- The documents describing the indicators for evaluating the required standard of the maintenance service and the performance indicators to be used in evaluating the performance of the contractors
- The liability for quality, quality control, quality monitoring and quality reporting.

During the preparations the principle was that the production side of the commercialising Road Administration, during a transition period to be agreed on later, would be competing with companies operating on the markets for all kinds of road planning, construction and maintenance work.

4.2 The Finnish Road Enterprise's preparations

As a potential provider of services, the task of the Finnish Road Enterprise was to prepare itself for a possible later open invitation for bids for public road planning, construction and maintenance services. In 1998 the reorganisation of Finnra paved the way towards an entirely new vision, new values and new business strategies for production. A start was made on the groundwork, with the aim of making Finland one of the biggest operators in the civil engineering markets. This meant that the entire business culture had to be reorganised. Thus, the organisational structure was immediately reformed. The business type project organisation provided the starting point for the entire development work. Where the supporting activities were concerned, the development work started off from a new base.

Immediately, an acute need for reducing the organisation's own labour force and for increasing cooperation with smallish subcontractors became apparent.

5. The 1998-2000 pilot projects for contracting out

5.1 Introduction

With the internal split into two organisations, it became possible to invite bids for public road maintenance on a pilot basis, with the Finnish Road Enterprise competing against outside contractors. A pilot project was soon underway for contracting out planning, construction and maintenance.

The purpose of the pilot project was to gain some knowledge of the advantages and disadvantages of contracting out public road maintenance. The most important aspect was to determine the effect of contracting out on the efficiency of the markets, contract prices and quality of work. In addition, some experience was felt to be needed regarding the efficiency and economy of the new purchasing methods, new comprehensive service contracts, and new forms of contract. Another aim was to determine the effect of actual competition on the competitiveness of the Finnish Road Enterprise.

5.2 Regional contract tenders for routine maintenance in 1998-99

In each of the years 1998 and 1999 tenders were invited for five three-year contracts.

Contract target	Contract period	Contr-act road km	Contract price FIM mill.	Winner of contract
Harjavalta	1.10.1998-30.9.2001	520	12.6	YIT
Forssa	”	740	14.4	TIEL
Leppävirta	”	450	18.4	TIEL
Kannus	”	495	16.4	TIEL
Rovaniemi East	”	420	11.1	TIEL
Loviisa	1.10.1999-30.9.2002	560	14.7	TIEL
Savitaipale	”	510	14.0	TIEL
Hankasalmi	”	540	12.9	TIEL
Koskenkorva	”	530	18.4	TIEL
Kempele	”	700	21.9	Rakennus-palvelu Veli Karjaluoto

The method used for inviting bids was restricted to compliance with the international EU and Finnish regulations in which the evaluation was based on the overall cost.

The contract covered summer and winter routine maintenance work on parts of the regional road network (420-740 km). The share of winter maintenance work in terms of the total costs was approximately one half.

5.3. Quality specifications for routine winter maintenance work and quality evaluation

The road network within the contract area was divided into maintenance classes. For each class the quality standard was defined for the road network as a whole. The criteria used were the amount of snow, evenness of the road surface (= permissible depth of grooves in hard packed snow and ice), and friction. For each class the client had specified a deadline for corrective action for substandard quality due to weather conditions.

The main contractor carried the overall liability for the implementation of the contract. The person appointed by the contractor to bear the responsibility for the contract was required to organise, for example, weather monitoring in winter. The Road Administration makes the information in its road weather system available to the contractor through data communications. This appreciably helps the contractor to predict changes in the weather.

The contractor's task is to accomplish the necessary work, as well as to report to the Road Administration's traffic centre 3-4 times a day on the condition of the region's roads and the progress

made with winter routine maintenance work. It is also the contractor's job to demonstrate that the demanded quality specifications have been met and to report the results. The procedures used for demonstrating quality and for reporting purposes are measurements of the amount of snow and the groove depth in packed snow and ice, and friction measurement. The client's own road inspectors also carry out spot checks to verify the reliability of the information supplied by the contractors.

Feedback from road users also has to be gathered and reported to the client.

If the contractor is unable to maintain the quality demanded within the agreed periods for action, a deviation report has to be made for each deviation, giving the reasons.

5.4 Results of the 1998 invitation for bids for routine maintenance contracts

Finnra's Finnish Road Enterprise won four out of the five regional contracts for routine maintenance, while one was secured by a large Finnish company in the sector, YIT-yhtymä Oyj. From 3 to 5 tenders were received for each contract.

In the tender invitation the selection criterion used was the best price from the client's standpoint. All the bidding contractors were required to submit a quality plan showing in what way they planned to meet the quality specifications, if chosen for the contract. For evaluating the tenders and for the supplier selection the so-called two-envelope method was used. With this method the first envelope, in which there is no price, is opened; this envelope only gives the contractor's performance ability and quality production factors, which in this way are requested separately. The factors are evaluated and awarded points before the envelope containing the price is opened. After the opening of the envelope containing the price, the latter is also awarded points and the tenders are then evaluated on the basis of weighted attributes. In the evaluations, the theoretical weight given to the quality and performance points is 25% and that of the price 75%. A representative of the regional association of the federation of civil engineering associations in Finland also helped evaluate the tenders.

The tender stage was very successful. The contract documents drawn up were considered adequate and very few additional explanations had to be requested at this stage. However, the tender deadline was felt to be too short because the compiling of the necessary documents constituted a new and extensive process.

In regard to the points given for quality when comparing tenders, the Finnish Road Enterprise was a clear winner in terms of all the quality criteria in the contract. It was obvious from the tenders received from the other contractors that, although they were able to perform the actual work, they had not paid sufficient attention to the overall maintenance responsibility and the performance of routine maintenance on a real time basis, especially in the matter of winter maintenance. Standby for winter maintenance tasks, the machinery and labour resources, and factors affecting the contractor's performance ability, as well as the acceptance of environmental responsibility and occupational safety aspects, were often incompletely dealt with. However, the points given for quality were not the governing factor in any contract - the lowest price tendered was the over-riding criterion.

For four of the regional contracts the competition was fairly stiff: the difference between the cheapest and the next most expensive price quoted came to less than 10%. On the other hand, the next highest quotations were far higher. There was no clear awareness of a competitive price level among the bidding contractors.

The prices quoted in the winning tenders were around 20% cheaper than the previous contract rates of the Road Administration's internal negotiation contracts. No systematic quality differences were discerned between the private contractors and the Finnish Road Enterprise during the contract duration period and in audits carried out by the Finnish Road Administration. In the audits carried out by the

Finnish Road Administration it was found that the Finnish Road Enterprise, despite its government department style character, had adopted a precise and contractor type operating method.

5.5. Results of the 1999 invitation for bids for maintenance contracts

Contracting out on this occasion mainly followed the same basic principles as in the previous year. The most important changes compared to 1998 were as follows:

- The evaluation of tenders was deliberately delayed. Thus, a considerably longer period was also left for the selected contractor's preparations compared to the previous year. The contracting out of the work beginning in October of the same year started in March and the decision in regard to the contracts was made in June.
- The contract documents were improved. The most important change was in the grounds for sanctions/bonuses. Where the required quality was not attained, the method of cautioning the contractor was simplified and more scope was provided for sanctions. Sanctions and bonuses were established on environmental protection grounds for the amount of salt (sodium chloride) used to combat slippery conditions. The quality plan requirements were set out in more detail in regard to e.g. traffic and occupational safety.
- An obligation was added to the regional contractors' work for continuous monitoring of the condition of the road network and for the making of regular inspections of the road network. The contractors were further obliged to participate in the handling of official tasks in collaboration with the client. In this way, the availability of services to the road users could be assured.

Those regional road maintenance contracts drawn up by the client after negotiations with the Finnish Road Enterprise were based on the same quality specifications, contract documents and contracting principles as the other contracts.

Tenders were received from 4-8 contractors. Those interested represented large, medium sized and also smallish local Finnish contractors. Tenders were received from 3-5 contractors, depending on the location. In two regional areas the competition was relatively severe, and at a third place the difference between the winner and the runner-up was particularly wide. The winning tenders were cheaper than the customer's own preliminary cost estimates, with the exception of one contractor. In this invitation for bids the Finnish Road Enterprise won 4 regional contracts, while one smallish contractor won a single contract.

5.6 Pilot scheme developed the readiness for introducing more extensive open competition for road maintenance

Inviting tenders for winter and summer routine road maintenance on a pilot basis promoted both readiness among all the parties concerned and development activities for progressing towards more extensive open competition. On the other hand, the price level emerging from the open competition was markedly lower than in negotiated contracts for which there was no competition. The work input required for supervising the Road Administration's contracts compared to the total costs of these contracts was low and did not appreciably differ from that devoted to the supervision of contracts which were not open to competition.

Some criticism was heard from the small contractors, who said that the contracts were too large for them. However, the size of a contract had been deliberately chosen to give a contractor able to handle it a chance to manage the work with adequate professional ability and to keep salaried personnel on standby, especially in regard to winter road maintenance. Based on the experiences gained with the pilot projects, it was decided to improve the method as follows:

- to simplify the tender invitations and documents
- to provide more awareness among those making tenders on the quality specifications of the maintenance, their basis, and the nature of the desired service in winter road maintenance
- to support training for routine maintenance work
- to determine the need for developing the preconditions on the markets.

6. Road maintenance work to be opened more widely to competition in 2001

6.1 Road Administration and Finnish Road Enterprise as from 1.1.2001

After exhaustive preparations, the Finnish Road Administration (Finnra) was split into two parts on 1.1.2001, i.e. a state agency organisation, called the Road Administration, and a state owned enterprise, the Finnish Road Enterprise, for carrying out production tasks. In the legislation for the reorganisation of the Road Administration it was stipulated that construction work on public roads would be fully opened to competition within a transition period of two years and the planning and routine maintenance would follow the same course within a transition period of 4 years. The reorganisation came into force on 1.1.2001. While the preparations for reorganisation were under way the Road Administration's workforce had continued to decrease in size the whole time, so that by the time the division finally came approximately 1,100 employees were transferred to the Road Administration and 4,500 were transferred to the Finnish Road Enterprise. Thus, the number of permanent employees decreased during the 1990s to around half of the number in 1990.

6.2. New routine road maintenance contracts for 2001-2004

Based on the legislation in the new statute, preparations were made for expanding the contracting out of regional routine road maintenance. A plan was drafted for open competition according to which there would be an open invitation for bids for the routine road maintenance of public roads every year starting with 2001. The regions for which annual contracts would be awarded on a competitive basis were selected so that the regional contracts would be evenly divided each year over the whole country. Thus, the public road network has been divided up among approximately 100 regional contracts. These contracts run for three years..

The payment method is partially on the lump sum principle and partially on a schedule of rates basis.

In the 2001 spring all the contracts open to tenders also constituted 3-year regional routine road maintenance contracts. In regard to the work covered by the contracts 75-80% is paid for on a lump sum basis, and the remainder on a schedule of rates basis.

Winter routine maintenance as a whole, as well as an appreciable amount of the gravel road, traffic environment, construction and equipment maintenance, are all based on lump sum payment. Schedule of rates work includes the renewal and increasing of road signs, road surface repairs and verge filling, and the renewal of open ditches and culverts, as well as the addition of ballast to gravel roads during the spring melt and the addition of the wearing surface. The total price of routine winter maintenance has been calculated for a so-called normal winter, which is reviewed after every winter, taking into account the "difficulty" of that winter. For this purpose a chart has been prepared in which the variables consist of the total amount of snow over the winter, the amount of salt used, and the amount of grit used compared to the default values for each individual contract. On the other hand, if exceeded, the use of salt compared to the quota may for environmental reasons attract a sanction, and if below the quota a small bonus.

In the way described in section 5.3, the road network in these contracts has also been divided into different routine maintenance classes and quality specifications have been set for each class. The so-

called two envelope method, as described in sections 5.2 and 5.4, will also be used in those contracts, as well as for choosing a contractor in the future. During the contracting out period one part of the tender was a provisional quality plan in which the bidding contractor roughly describes the action it intends taking to attain the quality targets when carrying out work under contract.

The 23 contracts opened to competition in the spring of 2001 were offered in three lots at two-week intervals, each lot being resolved before the deadline for the next. All the contracts were resolved by 21.6.

The contracts will begin on 1.10.2001 and will last for three years. Each contractor is required to present a precise and extremely detailed quality plan agreement review for the winter routine maintenance, this review to take place at a date specified by the client in August 2001.

The winter maintenance quality reporting method used in the pilot projects was altered. It now takes the form of procedural reporting. This means that the main contractor for a specific area reports all the winter routine maintenance work on a daily and time of day basis to the client throughout the winter period. At their own discretion, the client's road managers also carry out their own spot checks.

For substandard quality, the client is empowered to apply a sanction, which may be a written caution, a fine, replacement of the person appointed by the contractor for bearing the responsibility for quality, or in extreme cases cancellation of the contract. Naturally, a written caution and a fine are the most commonly used methods. The size of a fine is detailed in the written contract.

6.3 Experiences with bidding for contracts and plans for continuation in 2002-2004

In the bids for routine maintenance work invited in the spring of 2001 the nation-wide YIT Rakennus Oy came out best among the private enterprises by winning four contracts out of the 23. Another nationally operating company, Skanska Tektra Oy, secured one contract, which was the largest of all, while one contract was won by a provincial company. The Finnish Road Enterprise secured 17 contracts. The contract price in the case of contracts for which bids were invited was generally 10% cheaper than Finnra's initial estimates. Contracts starting at the beginning of October 2001 covered 420-1,460 road kilometres and were worth FIM 12-48 million (USD 2-7 million) each.

The invitation for bids pilot project was very successful and the competition was extremely even. The number of bids received indicated that the markets are interested in contracts of this kind. In many cases the price differences were in the 1-5% bracket. Among the top bidding companies the theoretical 25% weighting effect of the points awarded for quality in practice was equivalent to 2-5% of the price.

The next quarter, comprising 26 regional contracts, will be opened to competition in 2002. The selected contractor will have to accept full liability for routinely maintaining the road network and for taking care of the traffic environment in that particular network. Contracts not open to bids will be accomplished as negotiation contracts with Finnra.

In the spring of 2004 the final quarter of the contracts will be opened to bids and the 2001 contracts will be competed for again.

6.4 Customer satisfaction to be followed up

According to the latest customer satisfaction poll, around half of road users are satisfied with the winter routine road maintenance. The standard of maintenance on main roads was considered good but on lower class roads the winter maintenance standard did not satisfy the respondents. Dissatisfaction was expressed in particular at the slipperiness, the amount of snow and the depth of grooves in the packed snow and ice, on roads in the lower class road network. The standard of

maintenance on lower class roads has also aroused a feeling of insecurity among the respondents, who expect a better standard of maintenance in the lower class road network. Based on the customer polls and customer feedback, the standard requirements for winter maintenance on roads in the lower road classes were raised slightly in the routine maintenance contracts applying to the 2001 autumn.

With the commencement of new contracts Finnra will continually be monitoring the level of satisfaction among road users in regard to road maintenance. The results will be made use of when establishing action frameworks and quality specifications.

7. New development trends

In principle, Finnra has had positive experiences with the regional contract pilot projects. Now the regional contracts introduced are suitable for large and medium sized Finnish companies which have a works management possessing sufficient expertise in the sector and equipment for routine maintenance purposes. The smaller contractors can serve as subcontractors to these main contractors.

However, the global trend is towards longer, comprehensive contracts conferring greater responsibility. In the regional contract scheme introduced in Finland it has already been observed that the 3-year contract is too short for the contractor to amortise the necessary machinery and auxiliary equipment investments. Consequently, it has been proposed that the contract period be extended to five years. On the other hand, the necessity for changing the contract quality specifications from technical quality specifications to end result specifications or functional specifications has become apparent. In this case, in regard to the method of payment there would be an increasing move towards the lump sum method. These changes would make it possible to take advantage of the contractor's own innovations to a greater extent than at present for accomplishing the work more efficiently.

A second common tendency is for a larger number of different tasks to be included in the same contract. In this context, the 10-year maintenance contracts introduced on a pilot basis in various parts of the world appear to be more interesting. These Performance Specified Maintenance Contracts include not only the maintenance work, but also the routine maintenance and rehabilitation work. In such contracts,

in addition to the normal contractor's liability for the routine maintenance work, the responsibility also extends to programming, planning and implementing the necessary road surface repair and replacement work, gravel surface maintenance work, road structure drying improvement work, and smallish constructional reinforcement work, as required during the 10-year period. Contract models of this kind permit the contractor to make use of its own product development work and innovations when planning and realising practical technical solutions.

Experiences of such contracts so far have been that with an increase in it will be possible to further increase the cost savings for the client organisation. On the other hand, more comprehensive contracts place new demands on the client organisation, road administration and also the contractor. The Road Administration's demanding task is to make sure that the final result specifications that it requires of the work are adequately stipulated. On the other hand, the importance of various kinds of managerial skills is emphasised in the contractor's expertise requirements.