



RIKSREVISIONEN  
*The Swedish National Audit Office*

RiR 2010:16 Summary

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Maintenance of railways

## Summary

In this report, *Riksrevisionen* (the Swedish National Audit Office, SNAO) presents an audit of the documentation on the basis of which the Rail Administration (succeeded on 1 April 2010 by the Transport Administration) planned medium-term and long-term maintenance activities. In November 2009, the SNAO presented a corresponding audit of the maintenance of hard-surfaced roads (performance-audit report RiR 2009:16) where it concluded that the Road Administration lacked adequate and reliable documentation to control the maintenance of the road network. The SNAO also found that the direction exercised by the Government over the operational and maintenance activities of the Road Administration had been passive in nature.

The Committee on Transport and Communications of the Riksdag (parliament) took a serious view of the shortcomings identified in the SNAO's audit, stressing the paramount importance of ensuring that maintenance resources are used efficiently and spent where they are best needed. The Committee also endorsed the recommendations made in the SNAO's report, characterising them as a valuable basis for the future developmental efforts to be undertaken by the Government and the agencies.

The SNAO recently noted with satisfaction that the Government informed the Riksdag of its intention to carry out a thorough review of operational and maintenance activities, in part as a result of the SNAO's report on road maintenance. According to the Government, that review will cover both roads, railways and sea transport.<sup>1</sup>

The SNAO has now also concluded its audit of railway maintenance, which started from more or less the same problem indications as the road-maintenance audit and has identified shortcomings in similar fields. The SNAO hopes that the observations, conclusions and recommendations of this audit will supplement the basis for the Government's announced review of operational and maintenance activities.

The new Transport Administration's spending on medium- and long-term maintenance of railways amounts to just under SEK 4 billion. In 2004 the Government adopted a 'track plan' covering operation, maintenance and investment for the railways owned by the central government. This plan addressed, for the first time, the long-term aspects of the operation and maintenance of the railways. At the end of March 2010, the Government adopted a new national cross-modal plan for the development of the transport system in 2010–2021.

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<sup>1</sup> Written Communication 2009/10:107, åtgärdsplanering för transportsystemet 2010–2021 ['Action planning for the transport system, 2010–2021'].

Decisions relating to medium-term maintenance actions were made by the Rail Administration as part of its annual rolling activity planning. A small part of the maintenance decisions are implemented under the multi-annual maintenance agreements that the Rail Administration has concluded with Banverket Produktion (a former internal business unit which has been called Infranord AB since 1 January 2010) and with other independent contractors. However, most of the maintenance actions covered by the present audit are implemented after specific tender procedures.

At the time of adoption of the current track plan, there was some criticism of the documentation that the Rail Administration had provided to the Government. Among other things, the National Road and Transport Research Institute (VTI) considered that the priorities decided by the Rail Administration were not based on cost-benefit analysis. In response to that criticism, the Rail Administration stressed that cost-benefit analysis was not the only ground on which it had prioritised maintenance activities.

A favourable cost-benefit ratio is one of the key objectives of transport policy alongside a long-term perspective, quality of transport, safety and regional considerations. The overall objective of transport policy is to ensure the provision of economically efficient and long-term sustainable transport services to citizens and business throughout Sweden.

One prerequisite for efficient control of maintenance efforts is that the documentation used to assess maintenance needs and costs must be reliable and adequate. Otherwise there is a risk that needs will be under- or overestimated and that resources will be misallocated.

*The SNAO's overall conclusion is that the Rail Administration has not managed to produce adequate and reliable documentation enabling efficient control of the maintenance of the railways owned by the central government. The direction exercised by the Government over the maintenance of railways has been passive in nature.*

However, the SNAO does note that the Government is planning a thorough review of operational and maintenance activities covering several modes of transport.

## **Purpose and organisation of the audit**

The purpose of the audit was to identify any shortcomings in the documentation underpinning assessments of the maintenance needs of railways owned by the central government and to propose, in the light of the shortcomings identified, changes that may improve the documentation to be used in future planning.

When evaluating supporting documentation, the SNAO's starting point was the requirements laid down in the Central Government Budget Act (SFS 1996:1059) and elsewhere to the effect that central-government operations must be conducted efficiently and that reporting must be reliable and give a true and fair view.

The main basis for the audit consisted of document studies and interviews with representatives of the Rail Administration and the Ministry of Enterprise, Energy and Communications.

## **Shortcomings in information about the state of the railways**

The information systems which are most important for maintenance planning have weaknesses in terms of functionality and data-reporting procedures. Other systems that support maintenance planning are inadequately developed in certain respects or lack transparent guidelines describing how they are to be used to handle the information. For example, reasons for replacing components are not recorded in the register of plant and equipment, and information about replaced components is not saved. Further, not all actions taken are recorded in the system used to report failures and faults, and it is not always possible to ascertain the causes of failures and faults. The data on the number of critical observations made during inspections are also uncertain, in part because the reporting procedures were changed in 2005. In other words, the operational statistics used for maintenance planning have shortcomings. Taken together, these shortcomings have curtailed the Rail Administration's ability to assess what maintenance actions need to be taken. Moreover, since some data from the information systems have been used in the Rail Administration's reporting to the Government, the shortcomings have also affected the quality of reporting.

## **Undeveloped analytical function**

In 2007 the Rail Administration began using a new model to assess and prioritise proposals for maintenance activities to be implemented within three years. There remain points of unclarity as regards how the grounds for prioritisation are to be applied and how proposals for actions are to be ranked by priority.

The new analytical function established at the former Rail Administration has not yet settled into appropriate working methods, and there are no guidelines specifying how the analysis of operational statistics at the level of individual components is to be performed. The analytical tools used by the Rail Administration have shortcomings in functionality and are not sufficient for in-depth analysis of individual components, which is necessary in the planning of major maintenance actions.

One of the analytical tools allows sophisticated analysis of operational statistics only down to the level of track sections, not that of individual components. To enable analysis at a more detailed level, individual employees have developed their own software applications, whose operational quality is unclear. In 2009 the Rail Administration concluded the first phase of the development of an analytical tool that will enable the integrated analysis of data from the various information systems down to the level of individual components. However, there are still no central guidelines on how to perform such analysis.

The Rail Administration began work to remedy these shortcomings or had plans for how it would remedy them, but even so the SNAO's overall conclusion from the shortcomings identified is that the internal planning documentation used by the Rail Administration to assess maintenance needs had shortcomings making maintenance planning more difficult and more costly.

## **Great uncertainty about lagging maintenance**

The Rail Administration's descriptions and analyses of long-term maintenance needs in the two most recent planning rounds are characterised, in the SNAO's opinion, by incompleteness and an insufficient level of detail. Figures in round billions of SEK are usually given for the operational and maintenance appropriations needed. The state of the railways was described in different ways in the two planning rounds, which is in part understandable given that this had not been done before and no set planning methodology had had time to evolve for long-term maintenance planning. One consequence of this is that the documentation to support operational and maintenance planning that the Rail Administration helped draw up in 2009 contains rather few data reflecting developments during the previous planning period. This makes it difficult to tell how the state of the railways has changed. However, the SNAO considers that it should have been possible for the Rail Administration to give a more uniform and comprehensive account in the most recent planning round, for example as regards the development of the average age and economic life of various types of plant and equipment. The other information provided about changes in the state of the railways is scanty, and the SNAO also finds that supplementary data indicate that the state of the railways can be maintained at the level of spending now established.

The SNAO's overall finding as regards the documentation used by the Rail Administration to assess maintenance needs is that there is considerable uncertainty associated with the Rail Administration's claim that the planned rate of replacement and modernisation will lead to further destruction of railway capital.

## **Poor knowledge of causal links**

When exercising direction over railway maintenance, the Government starts from objectives relating to various aspects of quality for passengers and buyers of transport services, above all the punctuality of trains. Given that the links between maintenance actions and impacts for train operators and passengers are in part poorly known, the SNAO considers it difficult to assess how maintenance actions influence above all the 'Quality' part-objective of transport policy. In the absence of identified causal links, the Rail Administration is forced to make its assessments of maintenance needs and impacts using inadequate (in some cases actually inexistent) basic data. This is clear not least from the Rail Administration's assessment, presented in its 2009 documentation, of the need to develop the technical standard of tracks as a way to enhance comfort during journeys. The Rail Administration found that the technical standard needed to improve in the major track sections even though it had not carried out any measurements to determine how passengers experience train comfort.

Experts in the field consider that there is a need for a long-term targeted build-up of knowledge, based on an economic model which is progressively supplemented with knowledge from both qualitative and quantitative studies.

## **The Government's direction over railway maintenance is weak**

The Government issued more or less the same directives on action planning in the past two planning rounds. The main difference in the most recent round was that the transport agencies were instructed to cooperate in planning. In the field of maintenance, inter-agency cooperation is reflected, among other things, in the fact that the Rail Administration and the Road Administration agreed on a joint structure of objectives, with six aspects of quality and a similar categorisation of stretches of rail or road.

In the SNAO's opinion, the directives on action planning have developed very little since the first time that planning of this type was carried out. The recently completed planning round took place six years after the first one, but the Government has not, for example, requested any follow-up to determine how maintenance activities have developed over that period. While information enabling such follow-up can be found in annual reports, that provided by the Rail Administration usually covers only three years. The additional specifications given by the Government in its 2008 Bill on the orientation of transport policy concern only issues that the SNAO considers to be relatively marginal from the perspective of maintenance.

In addition, the SNAO finds that there has been only very limited external quality assurance of action planning as regards operations and maintenance. The Swedish Institute for Transport and Communications Analysis (SIKA) was assigned a new role but had limited resources to familiarise itself sufficiently with the quality assurance of operations and maintenance.

The transport agencies provided extensive documentation to be used for action planning. However, the Government's decision on the operation and maintenance of railways is very brief and addresses issues that the SNAO deems to be relatively marginal.

## **The SNAO's recommendations**

Against the background of the shortcomings presented above and given that the Government has announced its intention to carry out a review of operational and maintenance activities in the transport sector, most of the recommendations are addressed to the Government. Some recommendations are also addressed to the Transport Administration.

### **Recommendations for the Government:**

- The Government should instruct the Transport Administration to develop its analysis and description of the state and maintenance needs of the railways, as well as its analysis of how its maintenance actions influence that state;
- The Government should instruct the Transport Administration to develop models and methods to assess the impact that maintenance actions produce for passengers and others who use or are concerned by rail transport;

- The Government should evaluate, in its planned review of operational and maintenance activities, experiences from its direction in the two most recent planning rounds as regards operations and maintenance. This evaluation should include assessing what documentation the Government needs as a basis for long-term decisions on the operation and maintenance of railways;
- The Government should instruct the Transport Administration to develop its model for the prioritisation of medium-term maintenance actions, among other things to ensure that the internal assessment criteria for maintenance planning are in line with the aspects of quality proposed by the transport agencies in their joint operational and maintenance strategy.

### **Recommendations for the Transport Administration:**

- The Transport Administration should develop the register of plant and equipment to ensure that it will include information about replaced components. The register should also contain more detailed descriptions of the reasons for replacing components;
- The Transport Administration should develop the system it uses to report failures and faults so as to ensure that the causes of failures and faults as well as the actions taken to remedy them can be recorded and made searchable after the fact in a simpler way than at present;
- The Transport Administration should examine how the change in the strategy on maintenance inspections has influenced its knowledge of maintenance needs.