



## **The Signalling Programme**

Banedanmark has begun a programme of work to replace the outdated Danish signalling systems. This programme will deliver two state of the art signalling systems across Banedanmark; the standard European Rail Traffic Management System (ERTMS) level 2 on the Main Line (the Fjernbane) with a Communications Based Train Control (CBTC) system on the suburban network around Copenhagen (the S-bane).

The total expenditure will amount to 18 billion DKK, of which approximately 15 billion DKK concerns the Main Line (Fjernbane) and 3 billion DKK the suburban network around Copenhagen (S-Bane).

### **What can the new signals do?**

A uniform high safety level and fewer delayed trains are just some of the advantages of the new signalling systems.

#### *The Main Line*

On the Main Line, the old systems will be replaced no later than 2021 with the standard European ERTMS level 2 system, which is a modern software controlled, radio based signalling system, where lineside signals are replaced entirely by in-cab signalling.

Furthermore, ERTMS is an interoperable system. It has been jointly developed through European Commission initiatives to promote European train travel and enables trains to drive between several countries without having to fit additional train protection systems, radio or other signalling equipment specific to one country.

The introduction of ERTMS on the Main Line will provide a number of considerable advantages compared to the current systems:

- Fewer delayed trains
- Reduced operation and maintenance costs
- Improved passenger information
- Reduction of equipment and material in the vicinity of the track
- Consistent high level of security throughout Denmark
- Potential increases in line speed and capacity
- Enabling the introduction of more direct train services to other European countries

#### *The S-bane*

On the S-bane, all lines will be equipped with a CBTC system at the end of 2018. This is a software controlled, radio based signalling system that includes additional features applicable to a more intensive, suburban railway network such as automatic train operation.



With the expansion of the existing Metro (the Cityring project), the new signalling system will improve the quality of public transport throughout Copenhagen, with reduced train delays, a more uniform train service and higher speeds.

Since CBTC reduces the amount of equipment in the vicinity of the tracks, maintenance costs are reduced. It also makes the installation of the new system easier, leading to fewer closures as the new equipment is rolled out across the S-Bane network. The contract for the delivery of the new CBTC system was signed with Siemens on 5 August 2011.

### **How will the Signalling Programme affect the passengers?**

The replacement of the signalling systems is a necessity that will improve the travelling experience for train passengers on both the S-bane and the Main Line, by:

- Improving punctuality (fewer delays)
- Higher speed and therefore shorter travel time on some lines
- Heightened security level
- Improved passenger information
- Eradication of age-related signal failures
- Improved operational reliability

### **Optimising Energy**

The acceleration and deceleration of trains take up a significant share of their total energy consumption. This is expected to decrease with the implementation of the ERTMS system. This will mainly be due to the ability of the new signalling system to enable a more detailed knowledge of how all trains are running at any given time, and due to the extension and centralisation of the remote controlling which will mean contact with and control of all trains. These changes will in turn optimise the entire driving pattern.