

# **Performance-Based Contracts for Management and Maintenance of Roads (PMMR)**

## **Case Study 2: Denmark**



# Road Administration Structure in Denmark

**3 Levels:**

- **State (1)**
- **Counties (16)**
- **Municipalities (271)**

# Danish State Road network

State roads: 1,619 km



# Danish State and County Roads Network

**County roads:**

**9,702 km**

**16 counties**

**Average network:**

**approximately 600 km**



Source: Danish Roads Directory

# Danish municipality networks

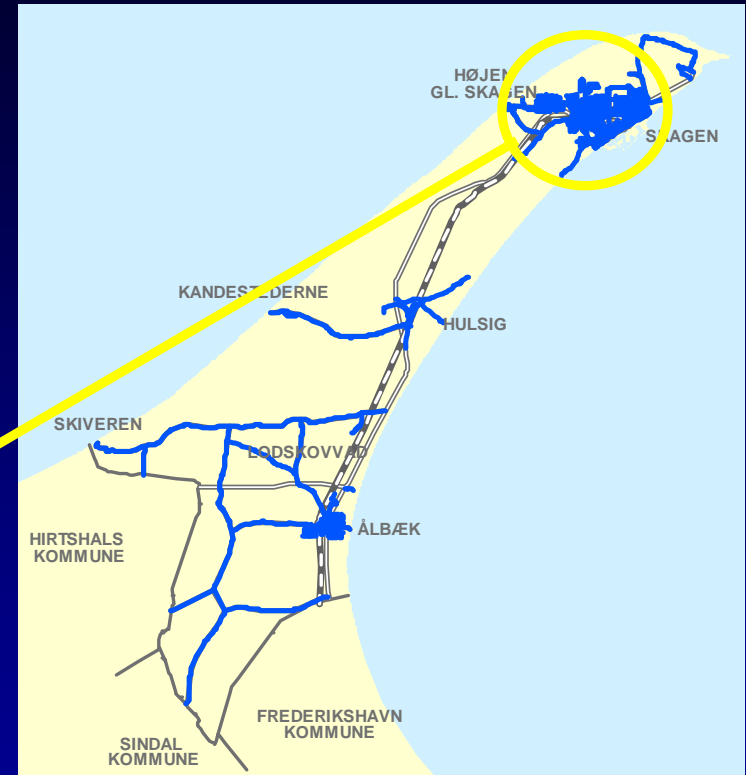
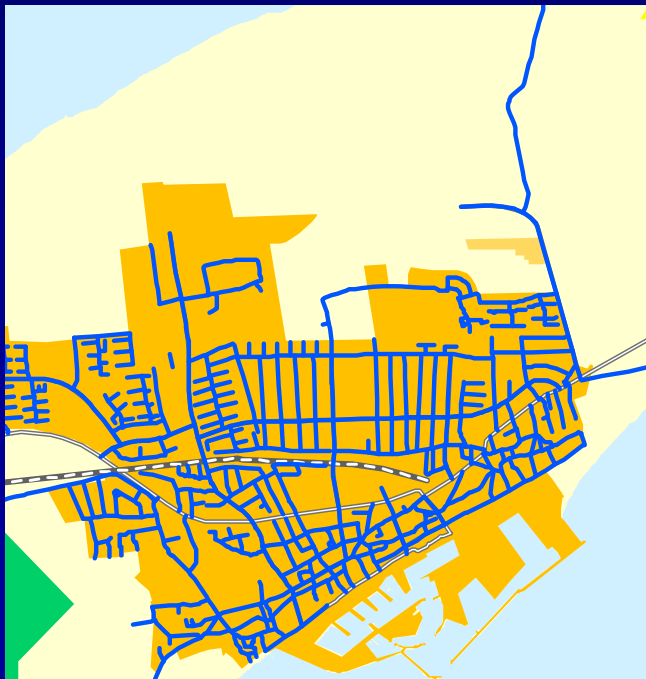
Municipality roads:

60,804 km

271 counties

Average network:

approximately 220 km



Source: Skagen municipality

# **Pavement Management Systems used in Denmark**

- **Danish Road Directorate  
(Belman and Vejman)  
State, 14 counties and 60 municipalities**
- **Dynatest  
3 municipalities**
- **Carl Bro (RoSy®PMS)  
2 (3) counties and 110 municipalities**



# **History of DK Performance Based Maintenance Contracts (I)**

- **1988/89 Asphalt contractor proposes to take over the maintenance of the municipality road network of Vamdrup and Billund**
- **During mid 1990ties several 6-year budgets formed the basis for hybrid asphalt contracts in municipalities**

# **History of DK Performance Based Maintenance Contracts (II)**

- **1998 1st County PBC contract was “signed” – 2 A4 sheets only**
- **1999 Formal work group ( 3 counties) founded for preparation and development of PBC tender documents**
- **2001 3 contractors joined the work group**



# History of DK Performance Based Maintenance Contracts (III)

- 2005 status:
- 44 on-going PBC for counties comprising 382 km roads at a total cost of DKK 160 million ( US \$ 28 million)
- 16 on-going PBC for municipality networks at a total cost of DKK 650 milion (US\$ 110 million)
- 2 consultants for PBC tendering in the Danish market

# Lessons learned (I)

- **The work in Denmark to develop PBC contracting appears to have been significant easier as in many other countries, benefiting from the Danish tradition of close liaison and development between road administrations, contractors and consultants.**

# Signature of 15 year PMMR contract (Mayor and Contactor)



# Lessons learned (II)

- The legal documents within the road sector, e.g. general and special specifications, are traditionally based on work made by joint committees of all the involved parties, typically 2-4 persons from the Danish Road Directorate, 2 -3 persons from the counties, and representatives from the municipalities and the consultants.

# Lessons learned (III)

- In general, the Danish specifications has for more than 15 years included a strong element of Key Performance Indicators (KPI) which combined with a general 5 year liability period has given all involved parties a head start being used to KPI.

# Lessons learned (IV)

- There has since the late 1980's been a tradition for using PMS in the Road Administrations at all levels in Denmark (state, county as well as municipalities) including well defined rules for measuring and quantifying defects.

# Lessons learned (V)

- From interviews with the leading persons in the development of the Danish PBC it is apparent that many were not aware of the work on PBC done outside Denmark, however it is remarkable how many parallels there are between the work in Denmark and the world outside.

# Lessons learned (VI)

- It is apparent, that the Danish contractors show a great trust in the PMS being used in the PBC and there does not appear to have been any reservations during the tendering phase in this regard.



# Lessons learned (VII)

**Clients selected PMMR for the following reasons:**

- **Fixed long term agreement.**
- **Only on tender for 15 years**
- **Fixed yearly payment**
- **Increase of road assets**
- **Constant monitoring of pavement condition**

# Lessons learned (VIII)

**Contractors motives to venture into PMMR contracts:**

- **Fixed long term agreement**
- **Investment in new equipment**
- **Development of new materials and methods**
- **Better planning of work (long term and short term)**

# **Consultant role in PMMR in DK**

**The Consultant is working solely for the Client during tendering as well as during the contract period.**

**Some contractor has expressed interest to have the consultant involved as a third party in the contract but today this has not been introduced.**

# Elements in Danish PCB

	Percentage of contracts
Road surfaces	100
Manholes and gullies	71
Bike paths	36
Emergency works	21
Adm. of excavation permits	57

# **Key performance standards for off-carriageway elements (I)**

**Manholes and gullies:**

**Done according to traditional contracting, but in connection with new surfacing.**

**Administration of excavation permit:**

**Max 2 justified citizens complains per month**

# Key performance standards for off-carriageway elements (II)

**Paved bike paths:**

**As for low volume roads**

**Unpaved roads:**

**- Ruts and ponding**

**< 10 mm      Reinstated with 12 months**

**10 – 50 mm Reinstated within 3 months**

**> 50 mm      Reinstated within 1 month**

**- No individual tire imprints > 5 mm**

# Payment plan

**Max yearly payment:**

**Contract sum/ years in contract**

**First 10 years of contract period:**

**Contractor has to justify that works equivalent to the yearly payment has been carried out. If not, annual payment is reduced proportionally**

**This payment plan encourages the contractor to move works to the first 10 year period**

# Penalties and bonuses

**The Contractor is severely punished by not doing sufficient works on a yearly basis as he for ever loses payment for this work even if it is made up for the next year.**

**There are no bonuses for good work**



# Problems encountered

Approximately 1 of 3 clients faced problems on:

- Insufficient inventory data
- Insufficient bearing capacity measurements
- Tree roots in or below the pavement surface
- Insufficient drainage
- Insufficient weed control

# **Post contract signature workshops**

**Half of all clients have participated in workshops after contract signature to improve working relations and promote project success**

**Contractors and clients staff have evaluated the workshops as very valuable for the future work on the PBC**

# **Citizens reactions**

**The citizens have noticed an increase in the overall pavement condition and asphaltting in general.**