

A WAY TO OPTIMIZE WINTER MAINTENANCE IN LATVIA

- **Jānis Kastanovskis**
- Head of Road Maintenance Control Department
- SJSC «Latvian States Roads»
- janis.kastanovskis@lvceli.lv



0. CONTENT

1. Introduction
2. Standards and rules
3. Organization of road maintenance
4. Winter maintenance technologies
5. Conclusions

1. INTRODUCTION





KEY INFORMATION ABOUT COUNTRY

Territory	64 589 km ²
Population	2.1 million
Total road length	69 688 km
State road length	20 120 km
Road network density	1.08 km/km ²
Gross domestic product in 2012	22 083 mill EUR
Road budget in 2012	253 mill EUR
Passenger cars per 1000 inhabitants	305

REQUIREMENTS IN STABLE WEATHER CONDITIONS

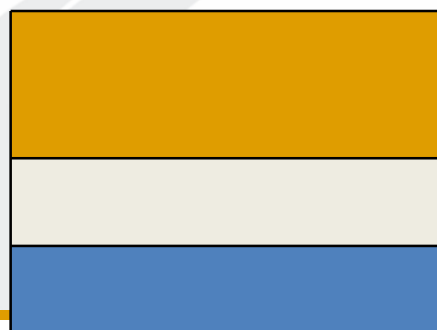
Requirements	Maintenance level				
	A	A1	B	C	D
	Acceptable conditions				
Snow thickness	Occasionally 1 cm	Occasionally 1 cm	4 cm	10 cm	Not defined
Ruts	Up to 1 cm	Up to 2 cm	Up to 4 cm	Up to 5cm	Not defined
Time for snow cleaning	3 hours	4 hours	6 hours	18 hours	Not defined
Time for prevention of slipperiness	3 hours	4 hours	6 hours	Not defined	Not defined
Thickness of snow on 2/3 of a shoulder	5 cm	10 cm	15 cm	20 cm	Not defined

REQUIREMENTS IN CHANGING WEATHER CONDITIONS

Requirements	Maintenance level				
	A	A1	B	C	D
	Acceptable conditions				
Snow thickness	6 cm	6 cm	8 cm	10 cm	Not defined
Slush	3 cm	3 cm	5 cm	6 cm	Not defined
Ruts	Up to 2 cm	Up to 3 cm	Up to 4 cm	Up to 6cm	Not defined
Working hours	6-22	6-20	6-18	6-18	Not defined

2. STANDARDS AND RULLES

Road maintenance classes			
	Main roads	Regional roads	Local roads
> 5000	A	A	A1
1000 – 5000	A1	A1	A1
500 – 1000	A1	B	B
100 – 500		C	C
< 100			D

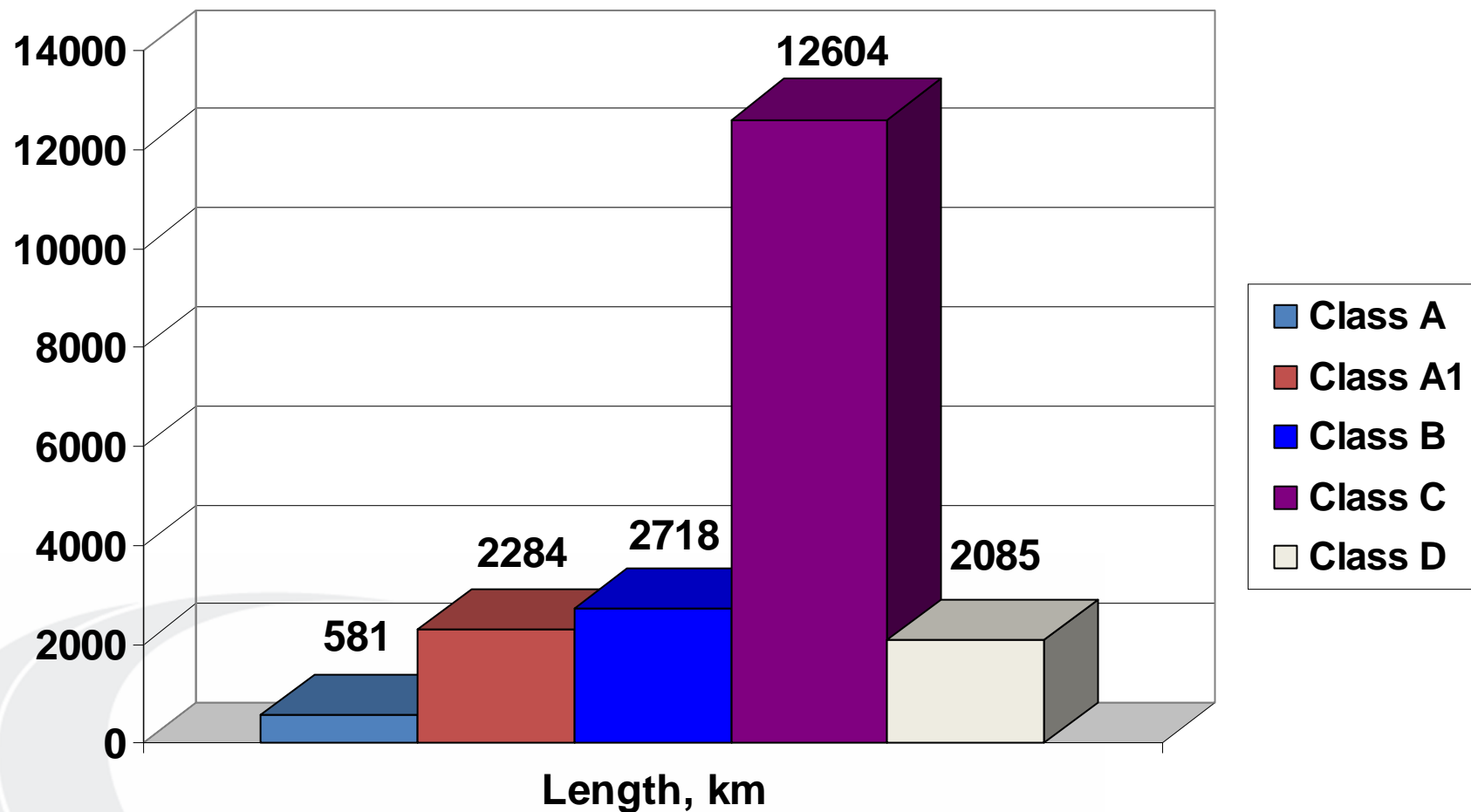


Road pavement free of snow and ice

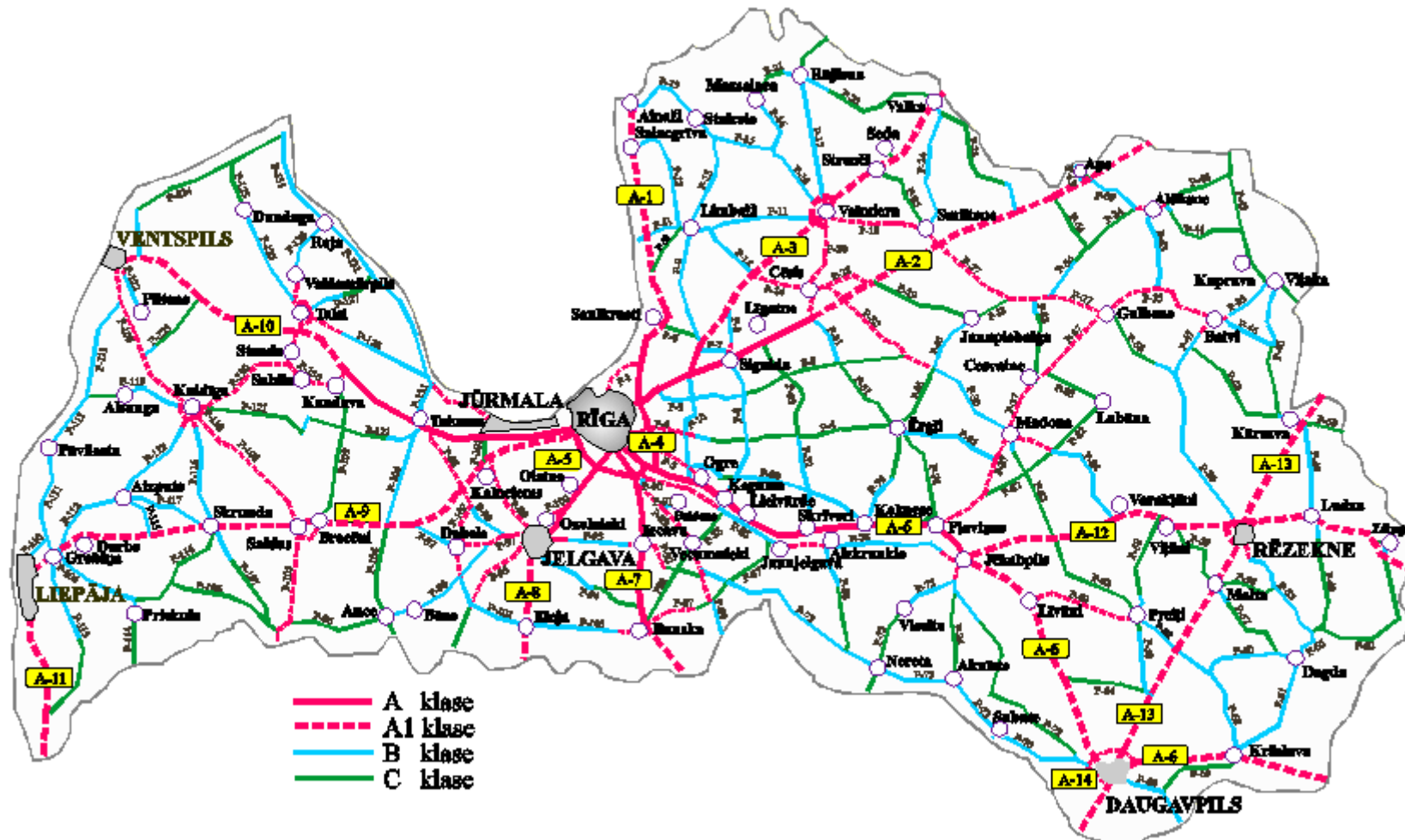
Roads with snow on surface during cold winters

Roads with snow and ice on surface

ROAD MAINTENANCE CLASSES 2013/2014

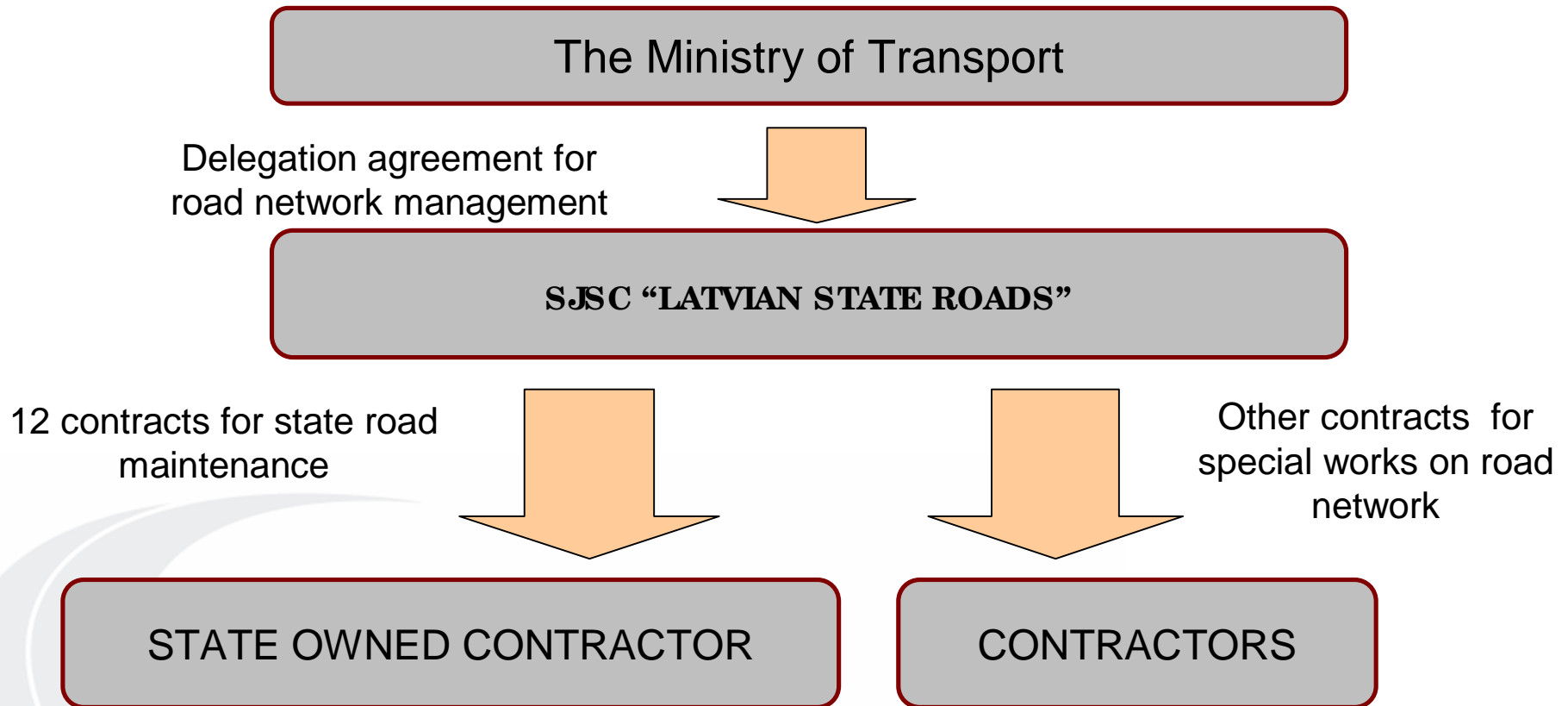


ROAD MAINTENANCE CLASSES 2013/2014



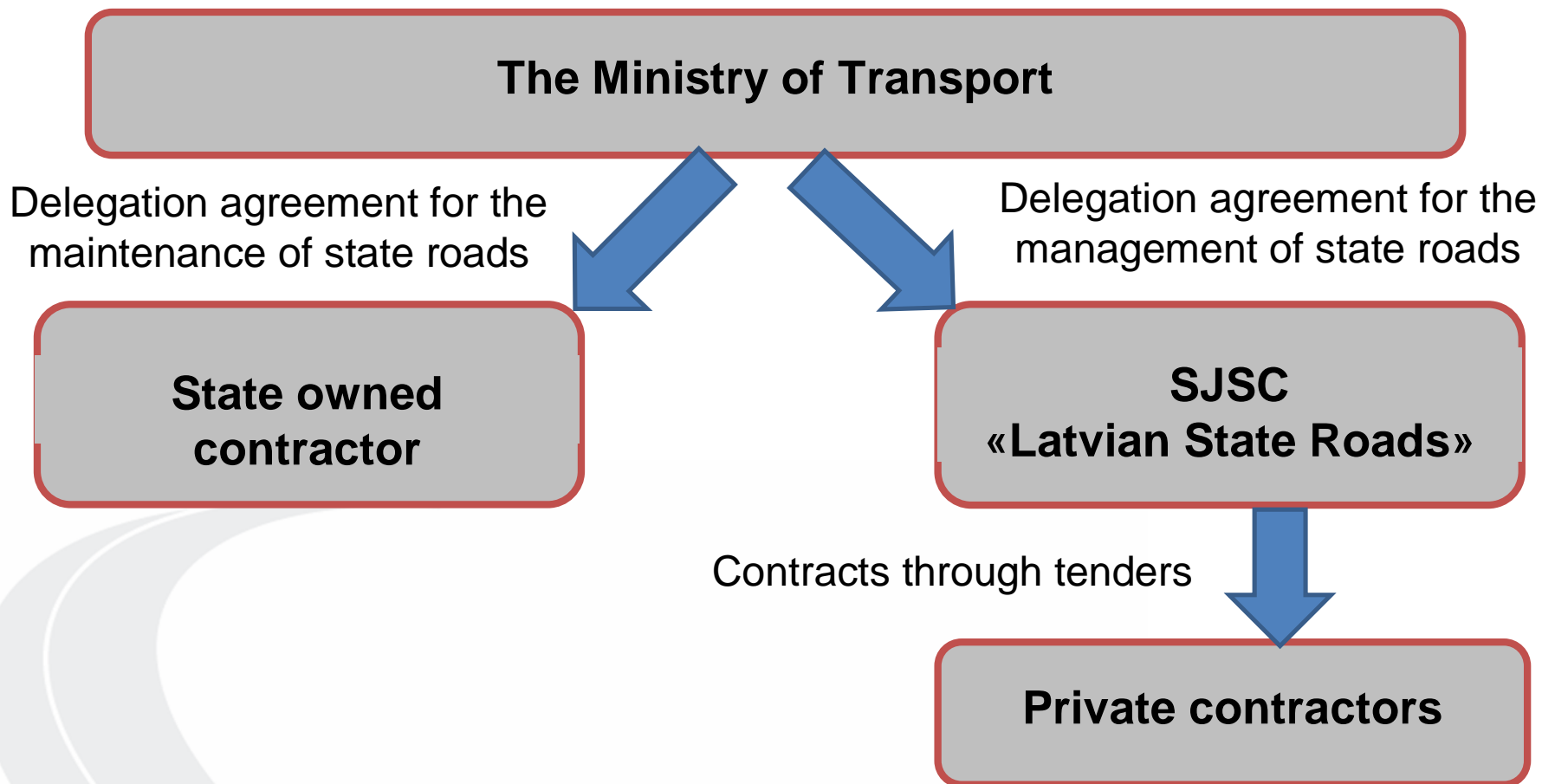
3. ORGANISATION OF ROAD MAINTENANCE

YEARS 2002 - 2013

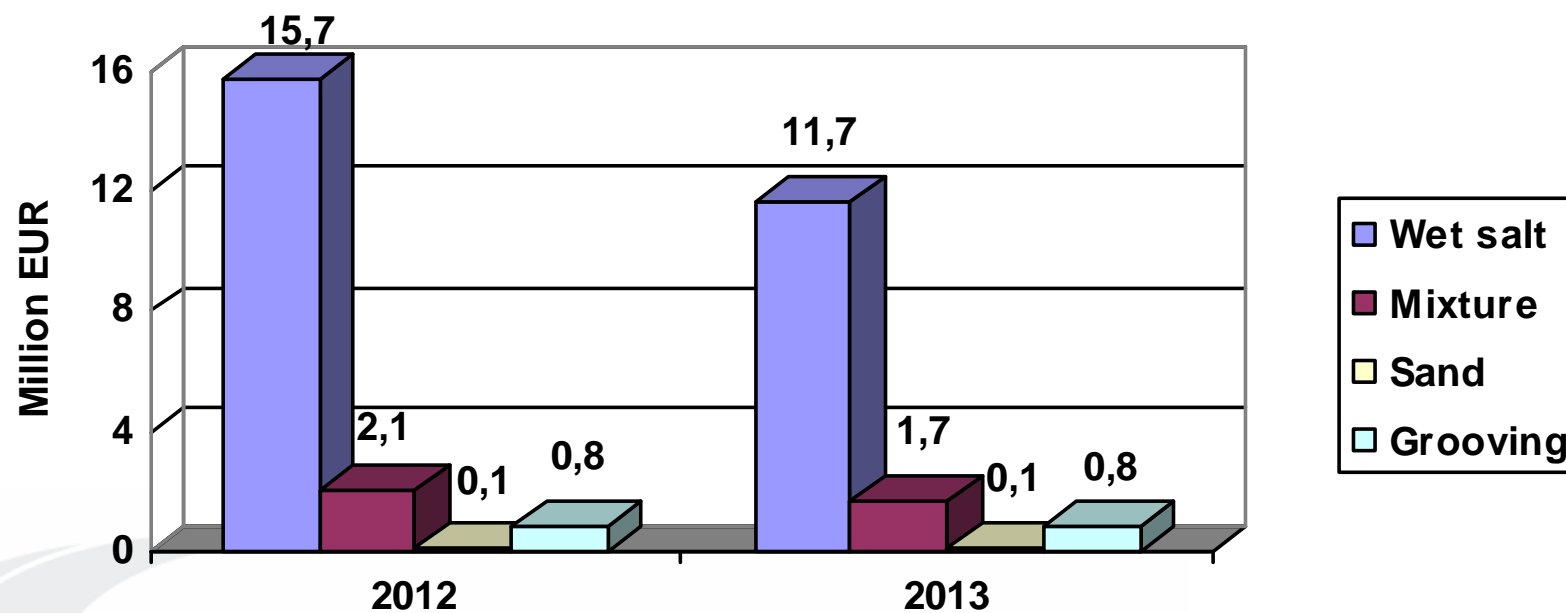


3. ORGANISATION OF ROAD MAINTENANCE

Currently



4. Winter maintenance technologies



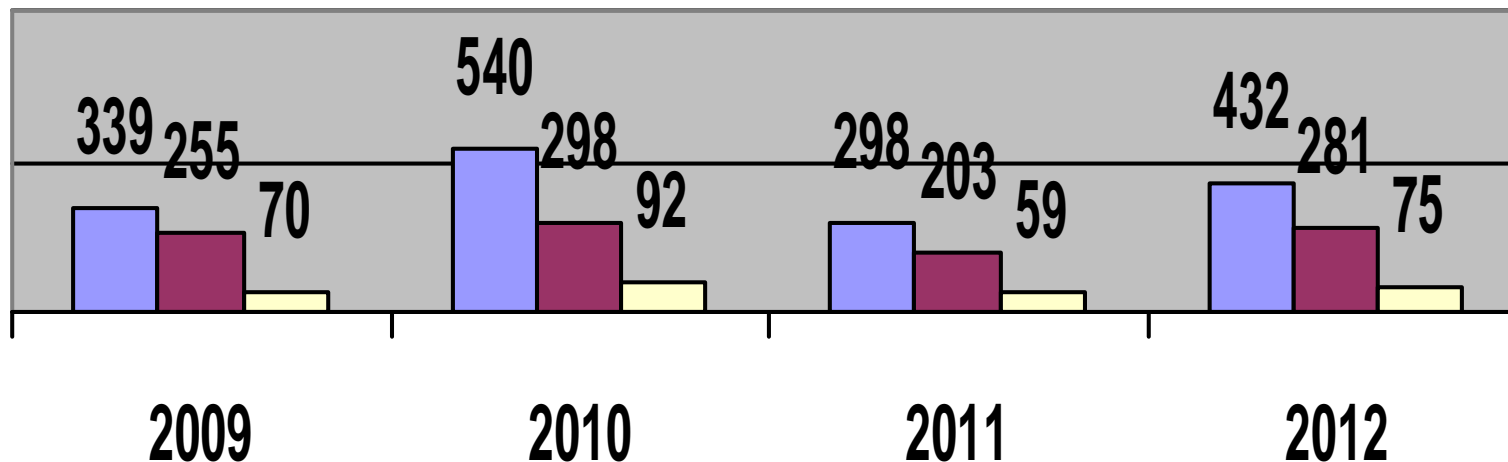
Winter maintenance index

Number of days with changing weather conditions	Price variation factor
Up to 3	0.5
4 – 8	0.8
9 – 18	1.0
19 – 21	1.1
More than 21	1.2

5. Conclusions

Road condition	2009	2010	2011	2012
Icy	116	228	178	175
Compacted snow	100	195	52	150
Wet snow	113	117	68	107
Total:	339	540	298	432

5. Conclusions



- Amount of accidents on snowy and icy roads
- Winter maintenance costs, hundred thousand EUR
- Days with changeable weather