



Republic of Turkey
Ministry of Transport Maritime Affairs
and Communications



GENERAL DIRECTORATE
of HIGHWAYS

TEM / HEEP AREA V 2017 ANNUAL MEETING



04 -07 June 2017

Dubrovnik / CROATIA



OUTLINE

1

GENERAL OVERVIEW of HIGHWAY NETWORK

2

ROAD MAINTENANCE WORKS

3

ASSET MANAGEMENT

4

CONCLUSIONS





1

GENERAL OVERVIEW of HIGHWAY NETWORK





ROAD NETWORK IN TURKEY

Type: Village and Forest roads
Responsibility: Special
Provincial Administration

Type: Urban roads
Responsibility: Municipal
Authorities



Type: Motorways, State & Provincial roads
Responsibility: General Directorate of Turkish Highways

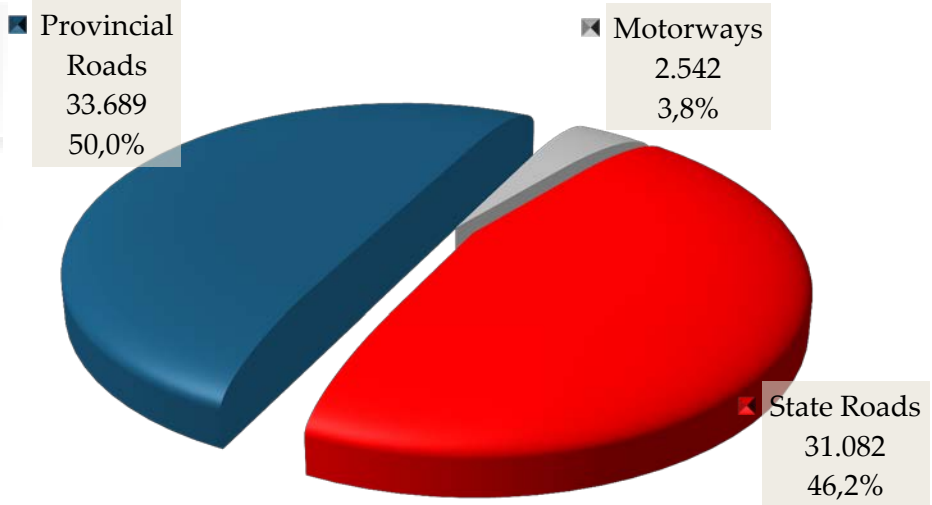
The road network excluding urban roads is about 385.000 km in length



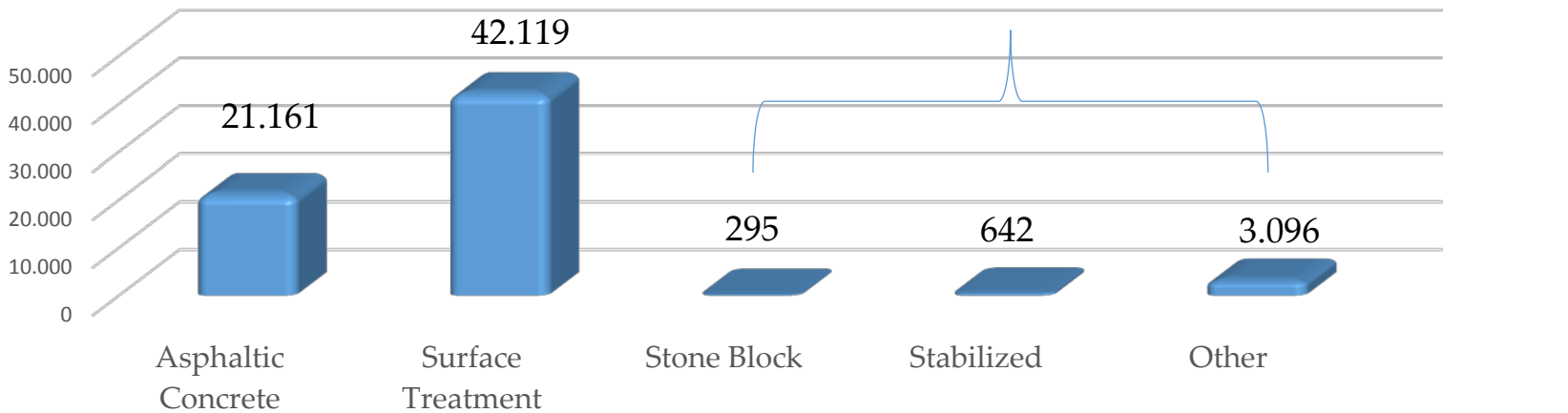
NATIONAL HIGHWAY NETWORK

- Total road network is 67.313 km.
 - 37.5% of total road network (25.235 km) is dual carriageway
- Total Replacement Value: **67 Billion \$**
- Road Density: **50 km / 100 km²** (Excl. Urban Roads)
- Motorway Density: **3,26/ 1000 km²**

Highway Network (Km)



Surface Type (67.313 km)





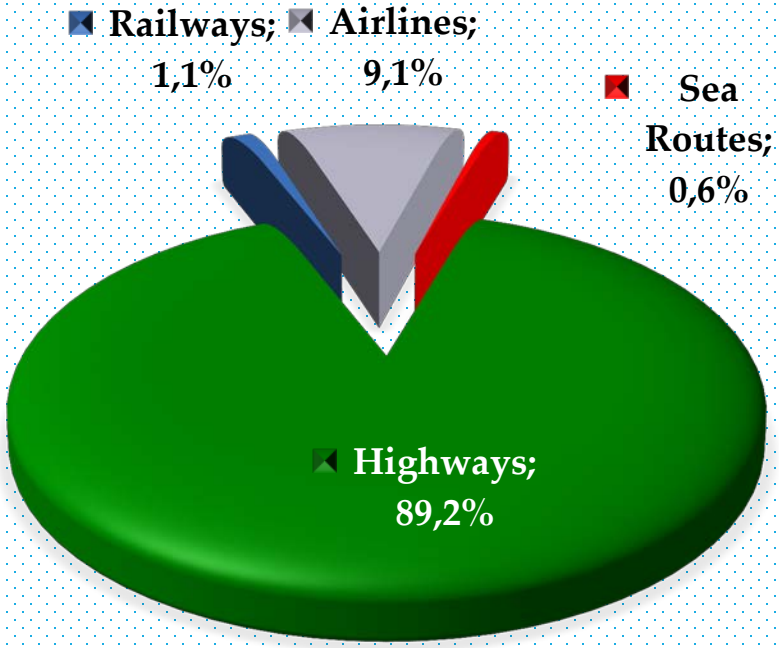
NATIONAL HIGHWAY NETWORK (67.313 km)

➤ Turkish Road Network under General Directorate of Turkish Highways' responsibility.



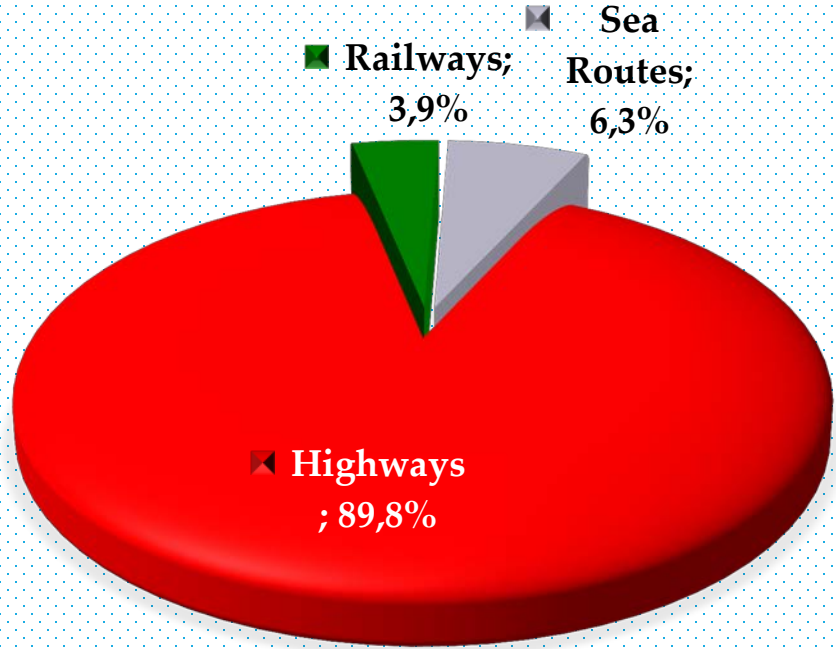
DOMESTIC PASSENGER & FREIGHT TRANSPORT 2015

PASSENGER TRANSPORT



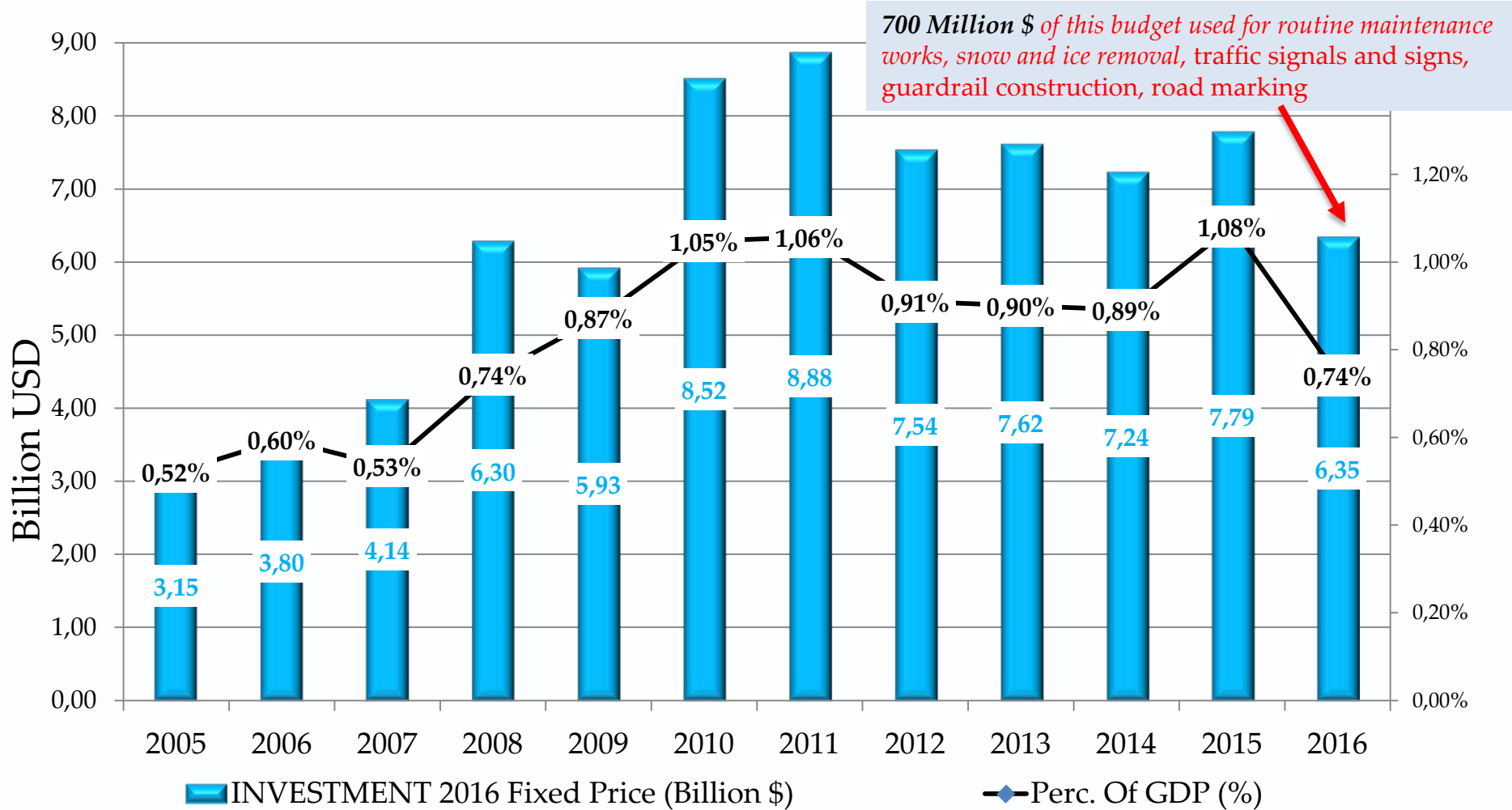
Passenger Transport
Highways: 89,8 %

FREIGHT TRANSPORT



Freight Transport
Highways: 89,5%

PERCENTAGE OF GDP USED FOR HIGHWAY INFRASTRUCTURE INVESTMENT





2

ROAD MAINTENANCE WORKS



REGIONAL DIVISIONS OF GDH



- 18 Regional Divisions
- 118 Subdivisions
- 277 Maintenance Houses
- 25 Motorway Maintenance and Operation Offices
- 2 Equipment and Supply Directories



ROAD MAINTENANCE WORKS

ROUTINE MAINTENANCE

Removing surface deformation on asphalt roads, corrugation and rutting on surface of stabilized road, repairing structures, such as, bridge, culvert, structures, clearing drainage systems, ditch and culverts as well as vegetation, etc.

SNOW AND ICE REMOVAL

Snow and ice removal has a considerable place in maintenance works. Removing snow and ice on roads during winter and providing a secure and smooth traffic flow are among these works.

EMERGENCY REPAIR

Maintenance in case of emergency and disasters

PERIODIC MAINTENANCE

To preserve the structural integrity of the road, or to enable the road to carry increased axle loadings.

ROUTINE MAINTENANCE



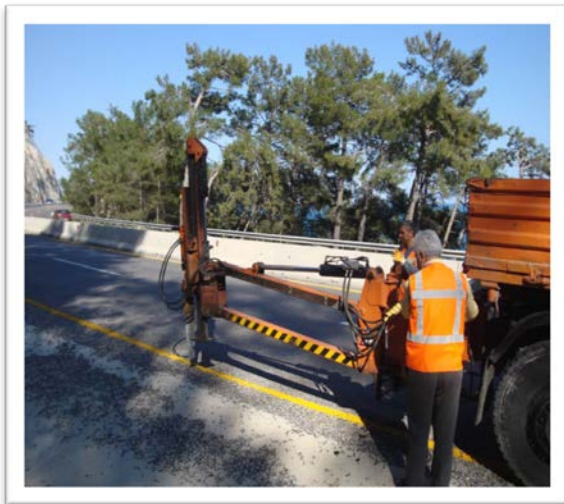
Patching



Surface Treatment



Ditch Cleaning



Maintenance of traffic signs and engineering structures



Verge Cutting



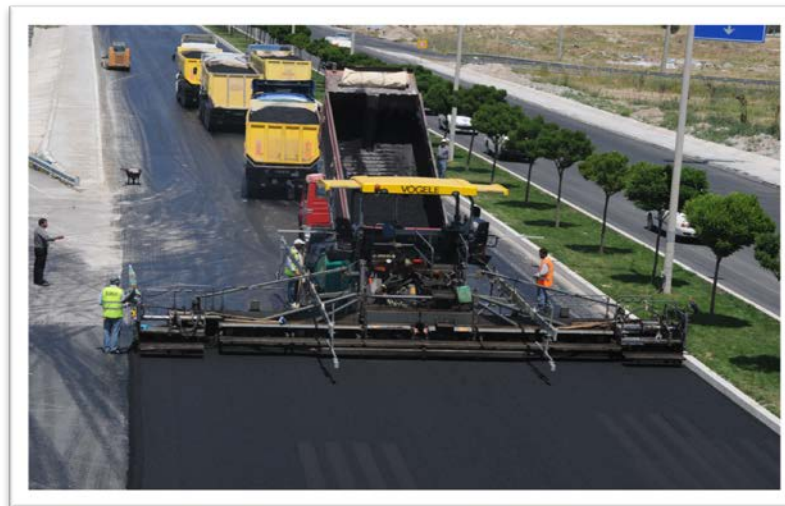
ROUTINE MAINTENANCE WORKS IN 2016

Maintenance Works carried out by	395 (118 Subdivision, 277 Maintenance Houses)
Maintenance Crew	7.833
Machinery & Equipment	6.011 & 752
Aggregates used for asphalt patching	1.192.000 m ³
Bitumen used for asphalt patching	130.000 Tonnes
Number of Planted Seedling (yearly average)	2.500.000
Number of GRP (Glass Reinforced Plastic) plates	900.000



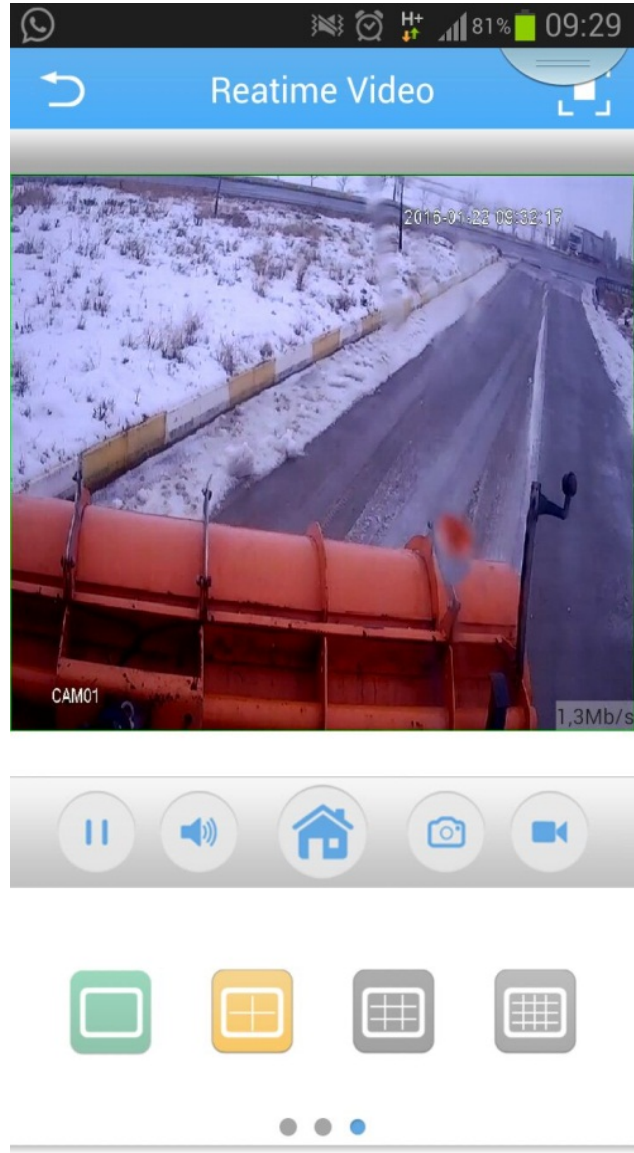


PERIODIC MAINTENANCE





SNOW & ICE REMOVAL WORKS





SNOW & ICE REMOVAL WORKS IN 2016-2017 WINTER



Network In Operation	54.723 Km
Network In Operation (If Possible)	8 626 Km
Maintenance Works carried out by	387 (117 Subdivision, 270 Maint. Houses. 24 Motorway Maint. Houses)
Maintenance Crew	11 119
Machinery & Equipment	7 636
Aggregates used	264 614 m3
Salt Used	247 662Tonnes
Length of snow fence	516 Km
Chemicals used for anti icing	808 Ton

MAINTENANCE IN CASE OF EMERGENCY AND DISASTERS



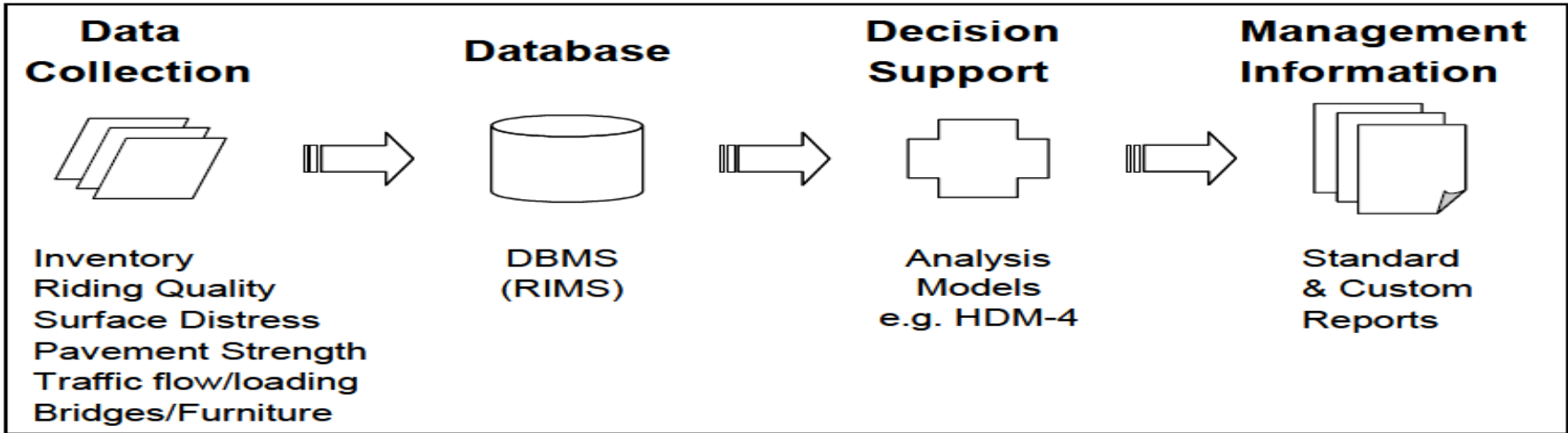


3

ASSET MANAGEMENT SYSTEM



ASSET MANAGEMENT SYSTEMS





ORGANIZATION CHART of MANAGEMENT SYSTEMS

Implementation Units

- Department of Maintenance
- Department of R&D
- Department of Structures
- Department of Traffic Safety

Standards Setting

- Department of Maintenance
- Department of R&D
- Department of Structures
- Department of Traffic Safety

Traffic & Transportation Statistics

- Department of Traffic Safety

Budget

- Department of Strategy Development

Technological Background

- Department of Information Technologies



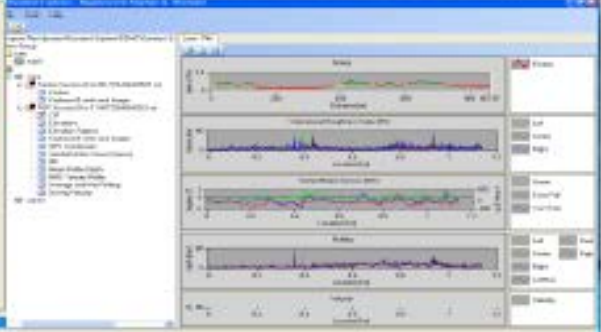
PAVEMENT ASSET MANAGEMENT SYSTEM



- ROAD INVENTORY
- PAVEMENT INVENTORY
- PAVEMENT PERFORMANCE
- TRAFFIC COUNTS
- CLIMATE
- COST

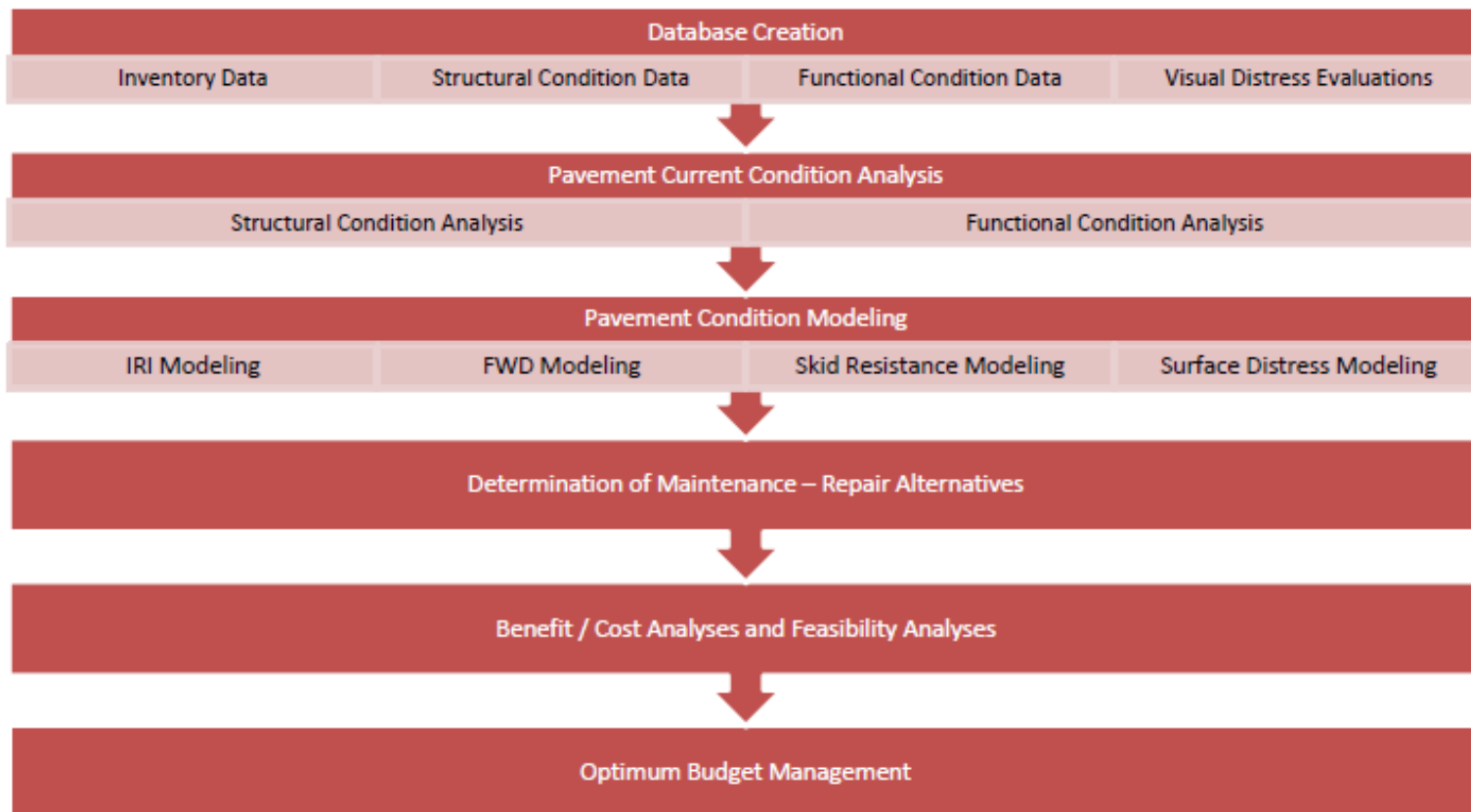
DATABASE

ANALYSES





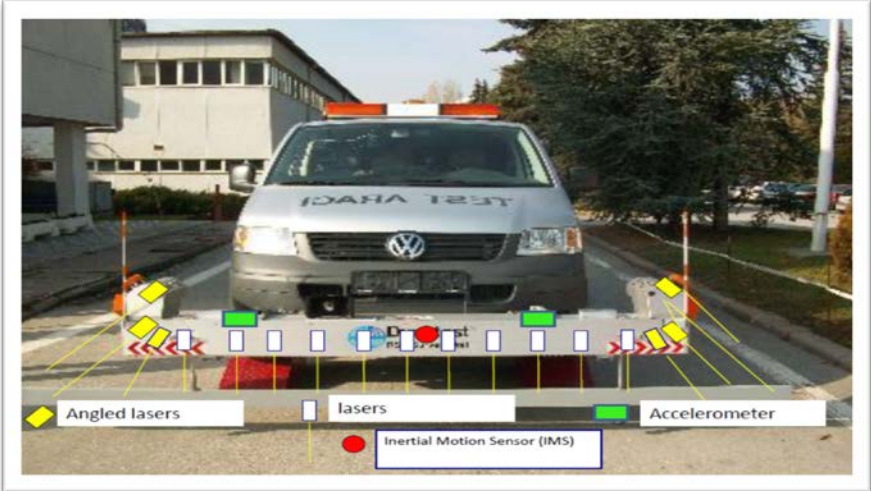
PAVEMENT ASSET MANAGEMENT SYSTEM FLOW CHART





PAVEMENT ASSET MANAGEMENT SYSTEM

ROAD PERFORMANCE TESTS





PAVEMENT ASSET MANAGEMENT SYSTEM

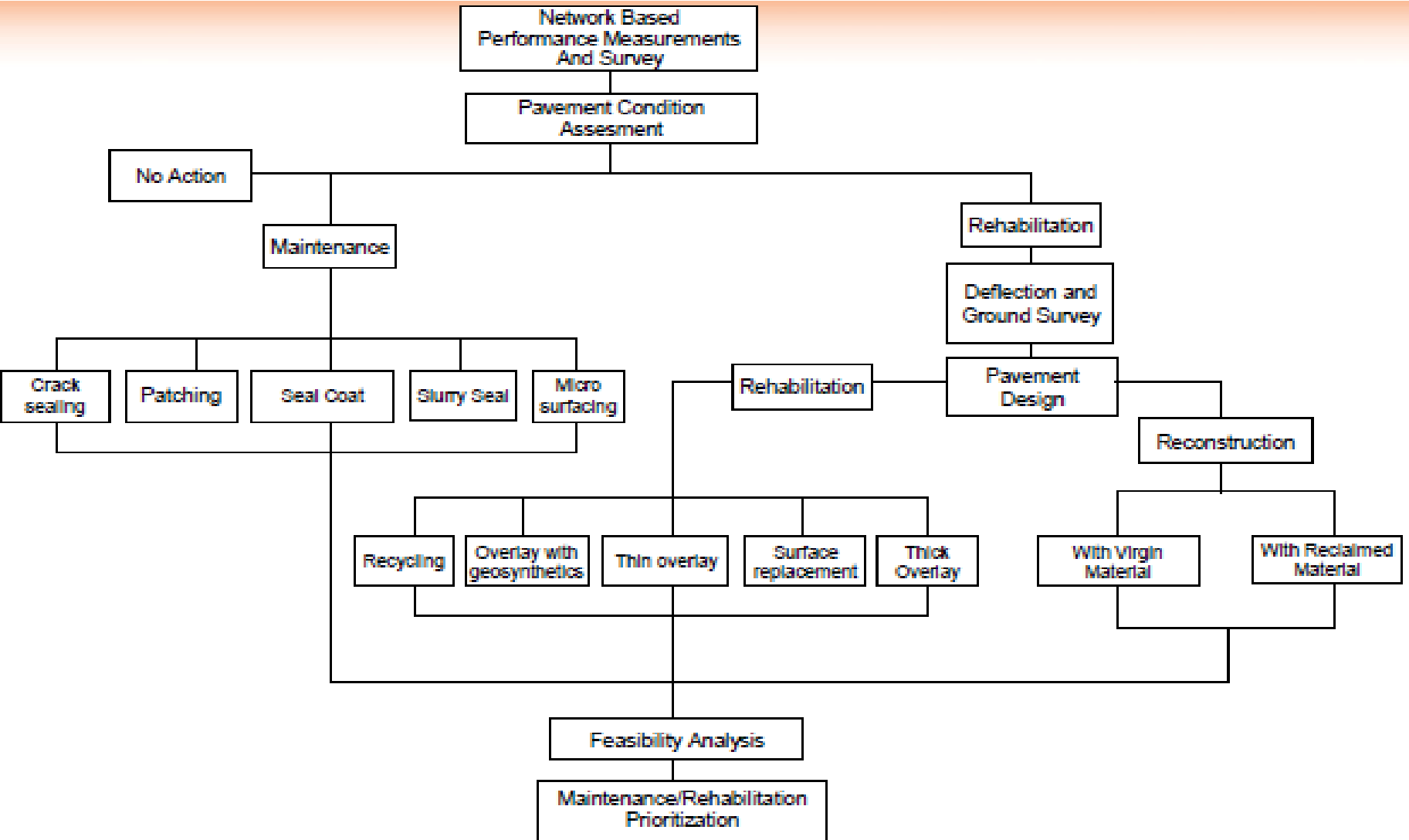
Pavement Pointing Table										
ROAD NAME:				PERSONAL INFORMATION						
ROAD NUMBER:				NAME - SURNAME:						
DRIVING WAY:				POSITION:						
STARTING KM:										
END KM:										
ÜSTYAPI BOZULMA TİPİ	POINTS (A)	DISTRESS SEVERITY (A)			DISTRESS DENSITY (C)					DAMAGE D=AxBxC
		LOW (0,4)	MEDIUM (0,7)	HIGH (1)	VERY LOW (0,6)	LOW (0,7)	MEDIUM (0,8)	HIGH (0,9)	VERY HIGH (1)	
Alligator Crack ✓	10	X				X				2,8
Edge Cracking ✓	5		X				X			2,8
Transverse Crack ✓	10	X					X			3,2
Longitudinal Crack ✓	15	X					X			4,8
Block Cracking	10			X				X		9
Rutting ✓	10			X					X	10
Waves	5		X			X		X		2,45
Local Settlement	5		X			X				2,45
Patch	5	X			X					1,2
Pathole	10	X			X					2,4
Bleeding	5			X			X			4
Stripping	10			X			X			8
Total Damage=										53,1
Total Structural Damage=										23,6
100 - Total Structural Damage = PSP=										76,4
100 - Total Damage =PP=										46,9
Pavement Condition=										Low

Roughness Value (IRI - m/km)	Roughness Classification	Priority Class
0	Absolute Perfect	
0 - 0.71	Very Good	6
0.72 - 1.11	Good	5
1.12 - 1.58	Average - Good	4
1.59 - 1.80	Average	3
1.81 - 2.13	Bad	2
> 2.13	Very Bad	1

Rutting Value (TIO - mm)	Rutting Classification	Priority Class
≤ 5	Good	4
5 - 15	Average	3
15 - 30	Bad	2
> 30	Very Bad	1

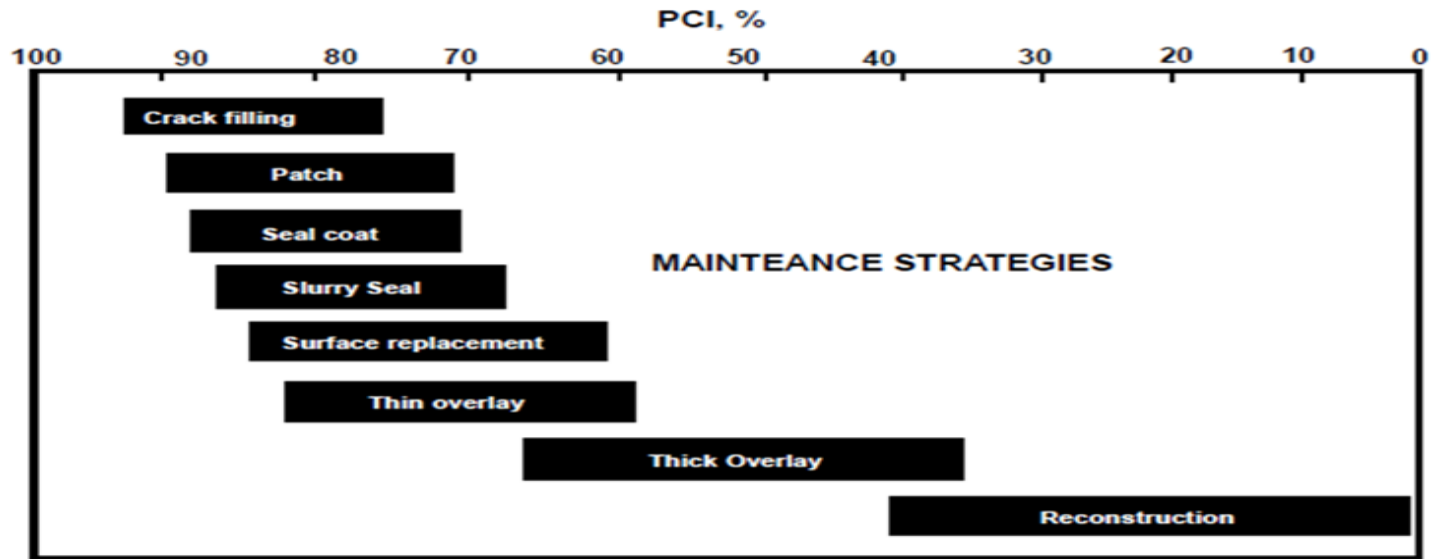


PAVEMENT ASSET MANAGEMENT SYSTEM DECISION TREE FOR ASPHALT CONCRETE ROADS



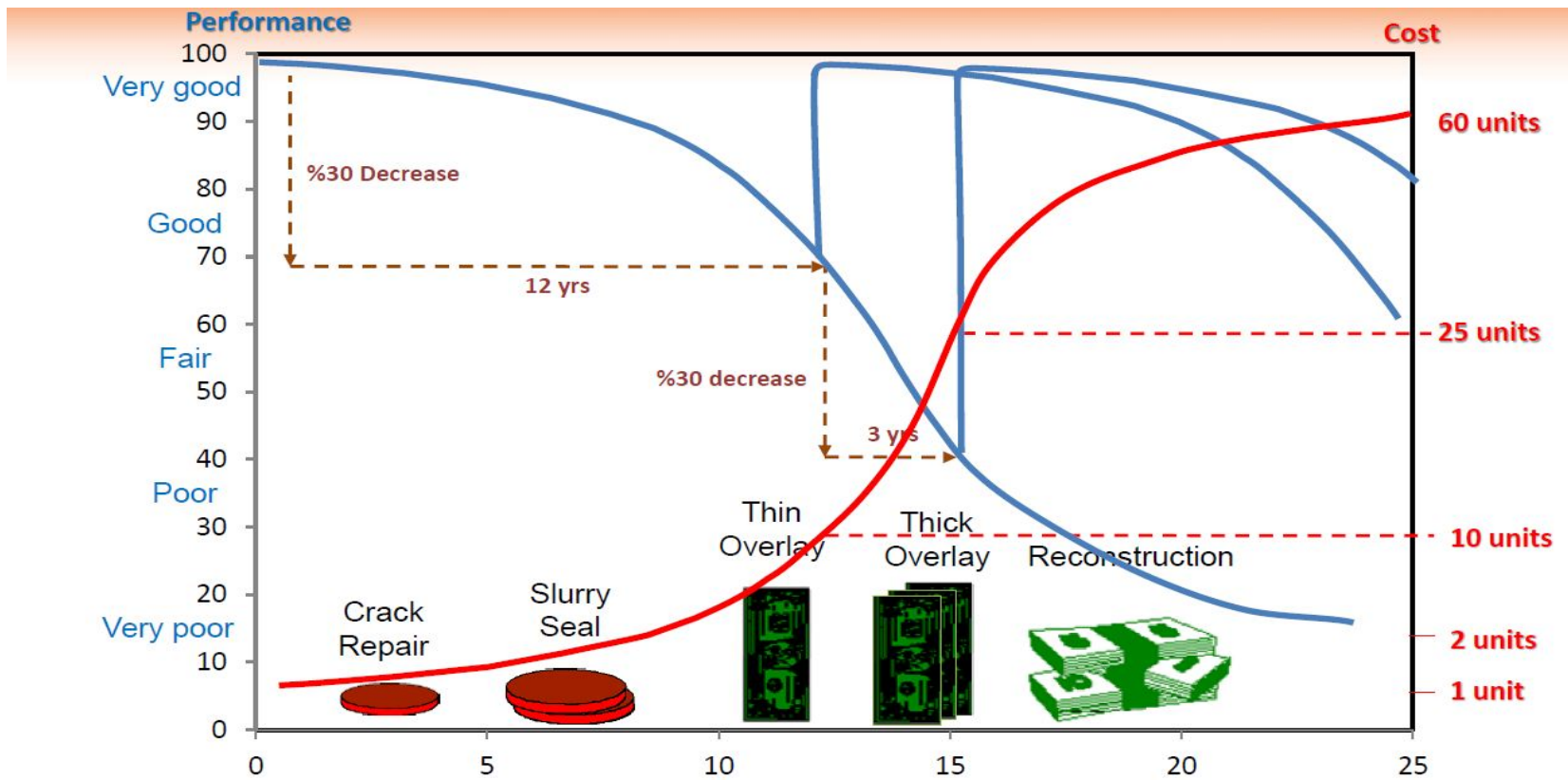


PAVEMENT ASSET MANAGEMENT SYSTEM



PCI	Pavement Condition	Strategy
100 - 90	Very good	No action
90 - 75	Good	Routine maintenance
75 - 65	Fair	Maintenance/Overlay
65 - 40	Poor	Thick Overlay
< 40	Very poor	Reconstruction

PAVEMENT ASSET MANAGEMENT SYSTEM



PMS provides a tool to select **the right road for the right treatment at the right time** and a road network operation with high performance pavement can be made with minimum cost.



4

CONCLUSIONS





CONCLUSION

- It is important that road maintenance works are made on time to avoid negative effects on economic life of infrastructure
- Proper road maintenance contributes to reliable transport at reduced cost, as there is a direct link between road condition and vehicle operating costs and travel time
- Establishing and developing Road maintenance/Pavement management systems are crucial in order to use the limited budget more efficiently.
- Combining all asset management systems is important to give better decisions for the investments considering all of the assets of our road network

THANK YOU FOR YOUR ATTENTION !

Mücahit ARMAN
Head of Strategy Development Department
Serkan YILMAZ
Expert Civil Engineer
Mehmet ÇELİKKAYA
Expert Civil Engineer

General Directorate of Turkish Highways
Ministry of Transport, Maritime Affairs and Communications