

PROBLEMS ENCOUNTERED IN MAINTENANCE AND REPAIR WORKS OF RAILWAYS



UDH
Bakanlıđı



PERMANENT WAY DEPARTMENT

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Head of Department



1. LENIGHT OF THE EXISTING LINES
2. SINGLE-TRACK LINE OPERATIONS
3. AGE-RELATED CONDITION OF THE TRACKS
4. MAINTENANCE PLANNING
5. CURVES WITH SMALL RADIUS
6. GRADIENT PROBLEMS
7. LOW AXLE PRESSURE
8. AXLE PRESSURE OF THE BRIDGES
9. AGE-RELATED CONDITION OF THE BRIDGES
10. AGE-RELATED CONDITION OF THE TUNNELS
11. TENDER PROCEDURES





1- LENGTH OF RAILWAY LINES

CONVENTIONAL LINES	: 11,272 KM
HIGH SPEED TRAIN (YHT) LINES	: 1,213 KM
LINES IN TOTAL	: 12,485 KM





2- SINGLE-TRACK LINE OPERATIONS

- 5% (569 KM) OF OUR CONVENTIONAL LINES WHICH ARE TOTALLY 11,272 KM, ARE COMPOSED OF 2ND, 3RD, 4TH LINES.
- TOTAL OF OUR HIGH SPEED LINES WHICH ARE 1,213 KM LONG, ARE DOUBLE-TRACK LINE.
- DUE TO SINGLE-TRACK LINE OPERATIONS IN 95% OF OUR LINES, REGULAR DAILY MAINTENANCE IS PERFORMED DURING FREIGHT AND PASSENGER TRAIN TRAFFIC.
- IN 2002-2014 PERIOD, A SCHEDULE WAS PREPARED ACCORDING TO THE FREIGHT AND PASSENGER TRAFFIC; AND TRACK RENEWAL AND MAINTENANCE WORKS WERE COMPLETED IN TOTALLY 83% (9,347 KM) OF OUR LINES WHICH ACCOUNTS FOR 5,814 KM FOR TRACK RENEWAL AND 3,578 KM FOR MAINTENANCE WORKS.





•IN ORDER TO ELIMINATE THE TRAFFIC CONGESTION CAUSED BY SINGLE-TRACK LINE OPERATIONS, INCREASE THE CAPACITY OF THE LINE AND CARRY OUT FREIGHT AND PASSENGER TRANSPORTATION JOINTLY, WORKS ARE IN PROGRESS FOR DOUBLING AND MAKING THE EXISTING LINES IN OUR NETWORK COMPLY WITH THE SPEEDS OF 160-200 KM/H.

•NEW LINES ARE DESIGNED TO BE BUILT AS DOUBLE-TRACK LINES.

•IT IS PLANNED TO CONSTRUCT 1000 KM CONVENTIONAL LINES, 8500 KM RAPID LINES AND 3,500 KM HIGH SPEED LINES UNTIL THE YEAR 2023.

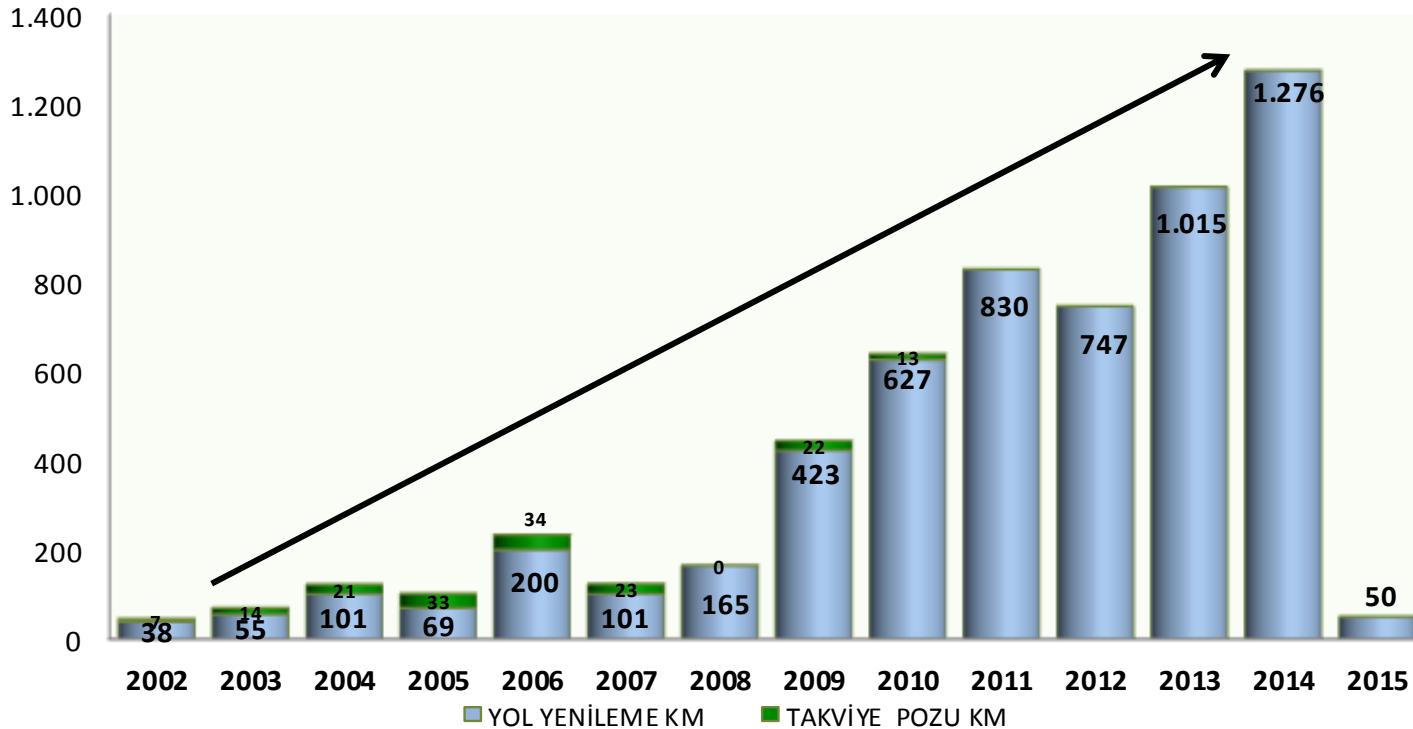
•LENGHT OF OUR LINES WILL REACH 30,000 KM BY THE YEAR 2035.





3-AGE-RELATED CONDITION OF THE TRACKS

- **SCHEDULED SPEEDS COULD NOT BE APPLIED BEFORE 2002 BECAUSE MAJORITY OF THE EXISTING LINES WERE DEFORMED.**
- **IN 2002-2014 PERIOD, TRACK RENEWAL AND MAINTENANCE WORKS WERE COMPLETED IN 83% (9,347 KM) OF OUR TRACKS INCLUDING 5,814 KM OF TRACK RENEWAL AND 3,578 KM OF COMPLETE MAINTENANCE WORKS, THUS, THE SCHEDULED SPEEDS ON THESE TRACKS WERE INCREASED.**





4-MAINTENANCE PLANNING

MAINTENANCE AND RENEWAL NEEDS

DEMANDS OF THE REGIONAL DIRECTORATE
AND CUSTOMER

PERMANENT WAY
DEPARTMENT
EVALUATION AND INCLUSION
IN THE PROGRAM

RPC AND
FINANCIAL
AFFAIRS
DEPT.

FREIGHT
DEPARTMENT

Internal
Customers

External
Customers

Traction
Department

TRAFFIC
DEPARTMENT

CONSTRUCTION
AND TRAFFIC
PLANNING
MEETING

PASSENGER
DEPARTMENT

Internal
Customers

External
Customers

Traction
Department

ARRANGING THE TIMETABLES
ACCORDING TO THE PROGRAM

TRACK RENEWAL
PROGRAM

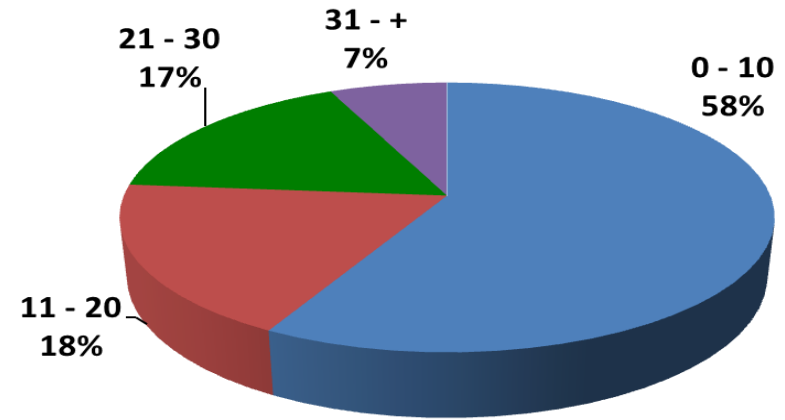
SUPPLY OF
MATERIALS, WORK
FORCE AND
MACHINERY

APPLYING THE
MAINTENANCE AND
RENEWAL PROGRAM





•AS A RESULT OF THE TRACK RENEWAL AND
MAINTENANCE WORKS IN RECENT YEARS, 76% OF OUR
TRACKS WERE INCLUDED IN AGE GROUP OF 20; AND
THE REMAINING PART OF 24% WILL BE COMPLETED IN
THE SCOPE OF ONGOING REHABILITATION AND TRACK
RENEWAL WORKS.



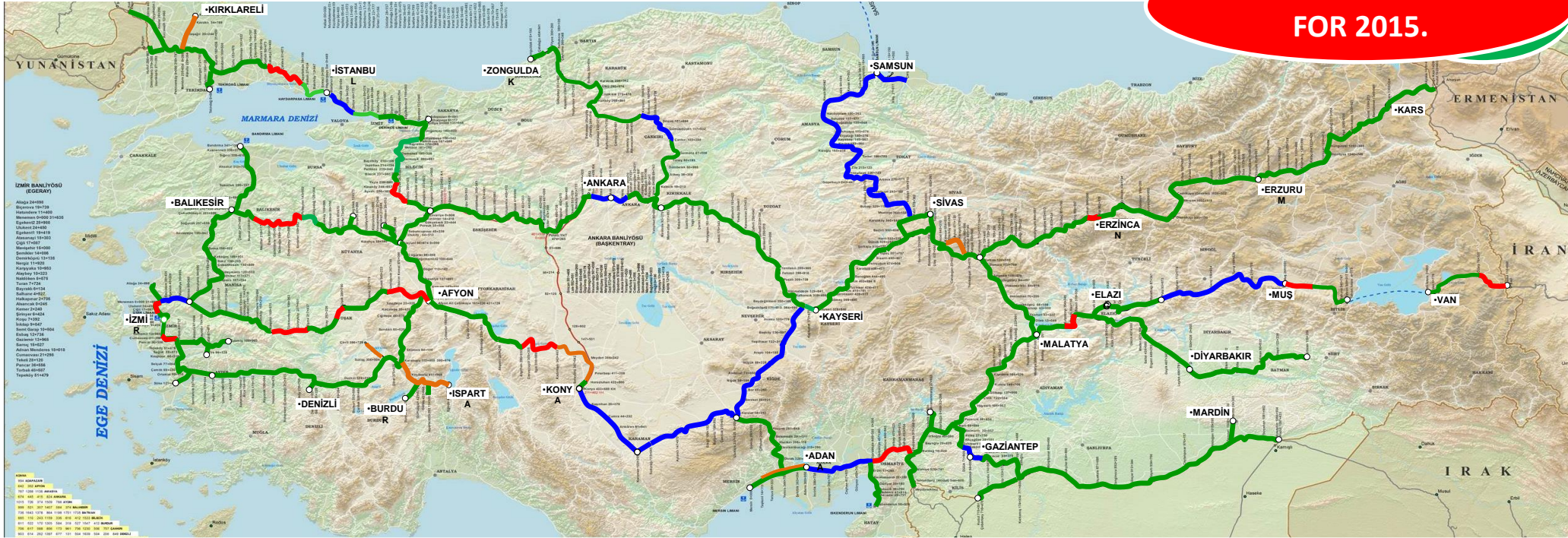
AGE GROUPS	LENGTH (KM)	% RATE
0 - 10	5.150	58 %
11 - 20	1.648	18 %
21 - 30	1.500	17 %
31 - +	605	7 %
TOTALLY	8.903	100 %





TRACK RENEWAL PROGRAM

845 KM IS PLANNED
FOR 2015.



■	RENEWED (with the age of 20-25)	8,600 km
■	TRACKS TO BE RENEWED IN 2015	845 km
■	TRACKS TO BE RENEWED IN THE SCOPE OF OTHER PROJECTS	1,216 km
■	TRACKS TO BE RENEWED IN 2016 (branch lines 350 km)	611 km
TOTAL LENGHT OF CONVENTIONAL LINES		11,272 km





5-LARGE NUMBER OF CURVES WITH SMALL RADIUS

- DUE TO THE FACT THAT THE CURVE RADIUS IS LESS THAN 1000 M IN 30% OF THE EXISTING CONVENTIONAL LINES, OPERATION SPEEDS ARE LOWER.
- TRACK MAINTENANCE COSTS INCREASE AS A RESULT OF THE WEARS OCCURRING ON THE CURVES WITH SMALL RADIUS AS WELL AS ON THE ROLLING STOCK.
- WITH THE PURPOSE OF DECREASING THE MAINTENANCE COSTS AND INCREASING THE OPERATION PERFORMANCE;
- RADIUS OF THE CURVES WHICH IS LESS THAN 1000 M IS ENHANCED TO MINIMUM 1500-2000 M.
- WORKS ARE ONGOING FOR STARTING TO USE THE RAILS HAVING HARDENED RAIL HEADS ON THE CURVES WITH SMALL RADIUS.



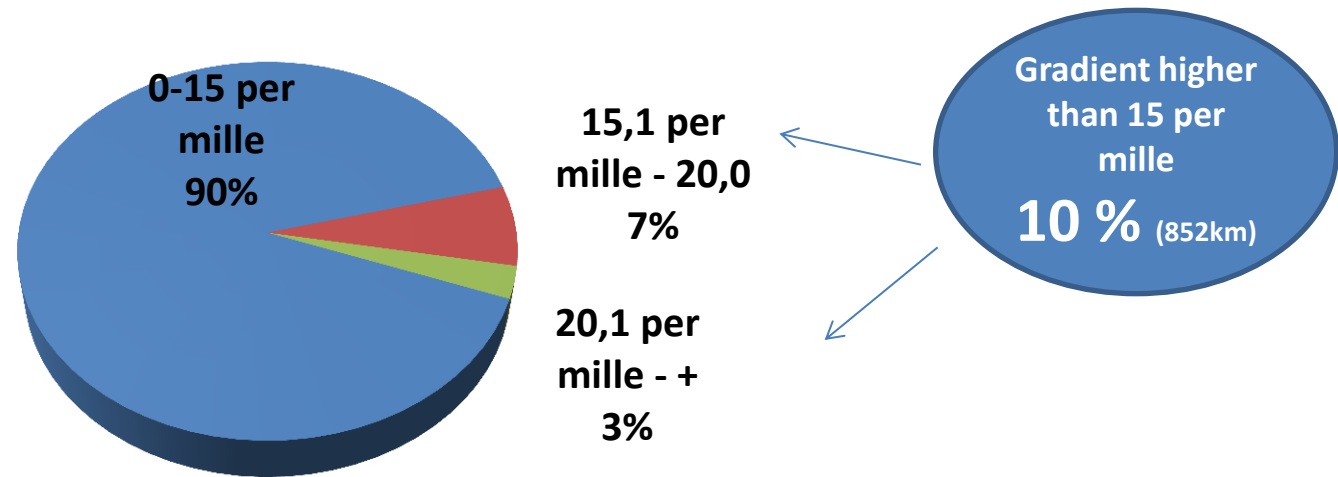
NUMBER OF CURVES
WITH A RADIUS LESS
THAN $R=1000$ M IS 906
(2616 KM).





6- PROBLEMS RELATED TO HIGH GRADIENT

- **RAIL WEARS ARE OCCURRING DUE TO STARTING AND BRAKING THE VEHICLES IN OUR LINES WHERE THE GRADIENT IS HIGH.**
- **FOR THE NEW RAILWAY PROJECTS TO BE CONSTRUCTED IN THE LINE SECTIONS WITH HIGH GRADIENT, MAXIMUM GRADIENT IS APPLIED AS 16 ‰.**
- **GRADIENT IS DECREASED BY BUILDING NEW DIVERSIONS.**



Gradient Per mille	Length (km)	% Among the total
0-15	8,051	90,4
15,1 - 20,0	606	6,8
20,1 - +	246	2,8
TOTAL	8,903	100,0

- **10% of our lines have gradient higher than 15 ‰.**





7-LOW AXLE PRESSURE

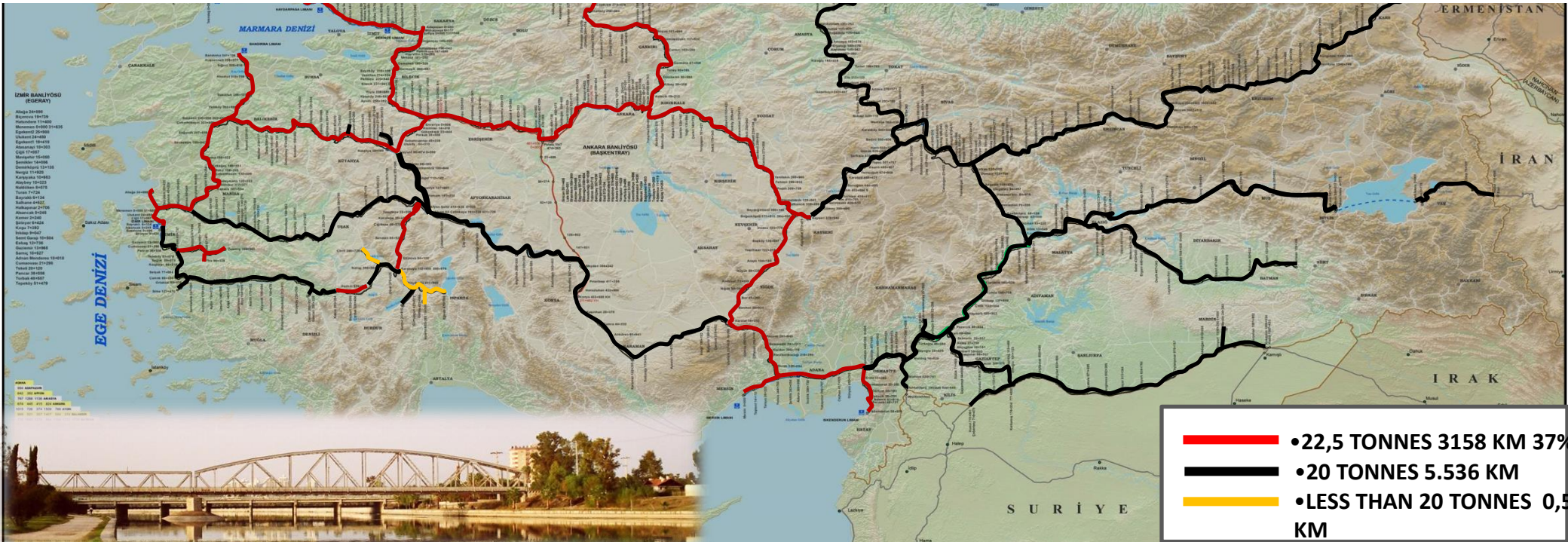
- 95.8 % (8,533 KM) OF OUR LINES COMPLY WITH 22.5 TONNES AXLE PRESSURE IN TERMS OF SUPERSTRUCTURE
- TOTAL OF OUR TRACKS WILL BE INCREASED TO 22.5 TONNES AXLE PRESSURE IN TERMS OF SUPERSTRUCUT BY 2015.





8-AXLE PRESSURE ON THE BRIDGES

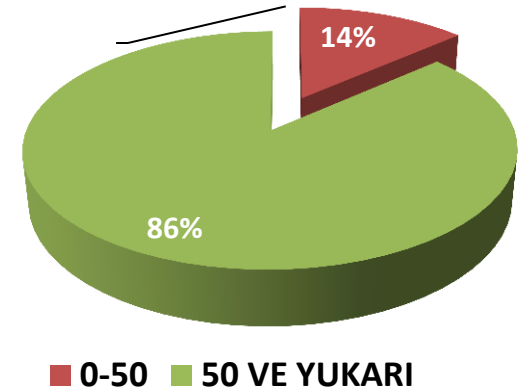
- 37 % (3,187 KM) OF MAINLINES IN TOTAL ARE COMPATIBLE WITH 22.5 TONNES AXLE PRESSURE AS FOR THE BRIDGES.
- 22.5 TONNES AXLE PRESSURE WILL BE APPLIED ON THE ENTIRE LINES BY MAKING ALL OUR BRIDGES COMPLY WITH 22.5 TONNES AXLE PRESSURE UNTIL 2016 WITHIN THE FRAMEWORK OF THE COOPERATION BETWEEN TCDD, TUBITAK (SCIENTIFIC AND TECHNOLOGICAL RESEARCH COUNCIL OF TURKEY) AND ITU (ISTANBUL TECHNICAL UNIVERSITY).





9-AGE-RELATED CONDITION OF THE BRIDGES

- BESIDES EXISTING BRIDGES AND CULVERTS ARE OF DIFFERENT KIND, 86 % OF THEM ARE ALSO OLDER THAN 50 YEARS.
- BRIDGES AND CULVERTS WITHIN THE LINES WHICH ARE RENEWED IN TERMS OF BOTH INFRASTRUCTURE AND SUPERSTRUCTURE AND WITHIN THE SECTIONS WHICH ARE TURNED INTO DOUBLE-TRACK LINES, ARE BEING RENEWED.





10-AGE-RELATED CONDITION OF THE TUNNELS



- **WATER FLOW AND DRAINAGE PROBLEMS ARE ENCOUNTERED**
- **BECAUSE 76% OF OUR TUNNELS ARE AT THE AGE OF 50 YEARS AND ABOVE,**
- **AND CLEARANCE PROBLEMS ARE FACED DUE TO ELECTRIFICATION PROJECTS,**
- **THERE ARE DIFFICULTIES IN MAINTENANCE AND REPAIR WORKS IN THE LONG TUNNELS.**
- **IN ORDER TO RESOLVE THE CLEARANCE PROBLEMS, WORKS FOR REDUCING THE ELEVATION BY SCREENING AS WELL AS THE DRAINAGE WORKS ARE IN PROGRESS.**
- **7 PCS. OF TUNNEL CLEARANCE MEASURING DEVICE WAS PROCURED TO MEASURE THE CLEARANCE OF OUR TUNNELS.**
- **SLAB TRACKS HAVE BEEN STARTED TO BE USED IN OUR TUNNELS TO INCREASE THE SAFETY AND ENSURE OPERATION EFFICIENCY AND RESOLVE THE CLEARANCE PROBLEMS IN THE TUNNELS IN THE CONVENTIONAL LINES**

AGE	KM	%
0-10	68	8%
11-25	4	0%
26-35	9	1%
36-50	118	14%
OVER 50	640	76%
TOTAL	839	100%





11-TENDER PROCEDURES

- TENDER PROCESS FOR MAINTENANCE AND CONSTRUCTION WORKS TAKES LONG TIME,
- OBJECTIONS AGAINST THE TENDERS DURING ASSESSMENT AND DECISION PHASE,
- PROCESS RELATED TO KİK (PUBLIC PROCUREMENT AUTHORITY) AND JUDICIAL PROCEDURES IS LONG,
- PROBLEMS ARE FACED WHILE PERFORMING THE CONTRACT AND CONTRACTS.





THANK YOU FOR YOUR ATTENTION

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Turkish State Railways
TCDD

