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FREIGHT WAGONS IN TURKEY: A COMPARATIVE STUDY

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1.Introduction

Turkish transport system is on the verge of being developed in railroad systems by means of both passenger and freight transportation with the aim of Turkey for year 2023.

Currently, Turkey has a large road vehicle fleet that makes its potential to become one of the most significant logistics hubs and transit countries in the region; 96% of passengers and 92% of freight are transported by road in Turkey. This is mostly because, most of the railways have only single track which leads to congestion on railway traffic. Geographic reasons and lack of airports are another important issues.

Nevertheless, besides interaction with E.U. region, Turkey has close relationships with both Mediterranean and Middle-East countries when it comes to trade. Turkey has goods such as textile, steel, basic chemicals, raw material, spare parts, food to end product, automobile, white appliances, agricultural products (70 % hazelnut needs of the world) [1], clothing and modern industrial plants in a globally competitive market.

This study is focused on both trade of the goods by railway (Section 1) and freight wagons (Section 2) that are used to handle this duty. Lastly, in Section 3, Final conclusion is presented.

2. Rail Freight Transportation in Turkey

2.1 General Overview

In Turkey, total length of the rail network is 10,984 km, of which 8,687 km are main lines [3] and 2,287 km are branch lines. However 95% among them are single-tracks and characterized by mountainous terrain, tight curves and steep gradients. 2,336 km of the railways which correspond to 21% of the network, are electrified; 3,111 km of the railways, corresponding to 28% of the existing network, are composed of signalization completed lines. For those railways, the allowed axle load is limited by 20 tons on about 61% and 22.5 tons on about 37%. The Turkish rail system is both jointed and welded, with concrete sleepers used on around 60% of the network [4].

Although slowed down after 1950s, railway transportation investments are increased by ongoing processes, due to high cost of road transport, to 50% of all transportation budget (almost 10 billion US Dollars) which is shown in Fig. 1 [2].

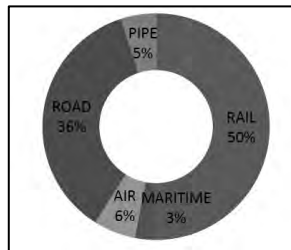


Fig. 1 Split of public investments in terms of modes

Consequently, freight transportation over railways are only little part (5.3%) of the whole transportation of trade goods of recent past, is shown in Fig. 2 [6, 7].

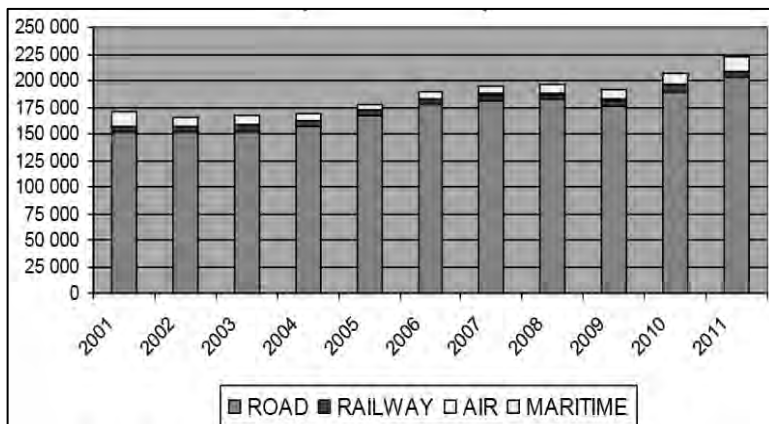


Fig. 2 The split of domestic freight transport in terms of modes (tonne*kilometers)

2.2 Ongoing Improvements of Freight Transportation by Rail

After 2000's, TCDD (Turkish State Railways) has changed its freight transportation strategy and shifted to "block train operations" from "piece-by-piece" transportation. 24.2 million ton of freight was carried in 2010 and when it is compared with the transportation in 2002, freight transport amount was increased by 67 percent. Also, the freight transport income was increased by 206 percent. But in general meaning; it is still almost 3% of all freight transported. From a different view; it is clear that ports connection with railways is so weak. For example, the biggest container port Ambarli-Istanbul does not have rail connection. Other important ports İzmir and Mersin ports already have railway connection. But unfortunately the ratio to link the hinterland by rail is around 2-3 percent of all. The rest is all to be transported via roadways [2].

Presently, Turkey lacks of railway infrastructure and transportation when you make a comparison with EU countries. The most urgent problem is the service and operational speed of the current railways. Turkey falls behind the EU average railway traffic as well [3].

In terms of type of good carriage; ore, coal, container and international transportation ratio is 78 percent of all transportation. Moreover, transportation of goods such as automobile, construction materials, food products etc. are now able to be transported by block trains. Regarding to international transportation, block trains are operated with a correspondence between Turkey and Germany, Austria, Hungary, Romania, Bulgaria and Slovenia in west and to Iran, Iraq, Pakistan, Syria and Pakistan in east, and to Turkmenistan, and Kazakhstan which are located in Central Asia. The present railway web can be seen from the Fig. 3 [8].

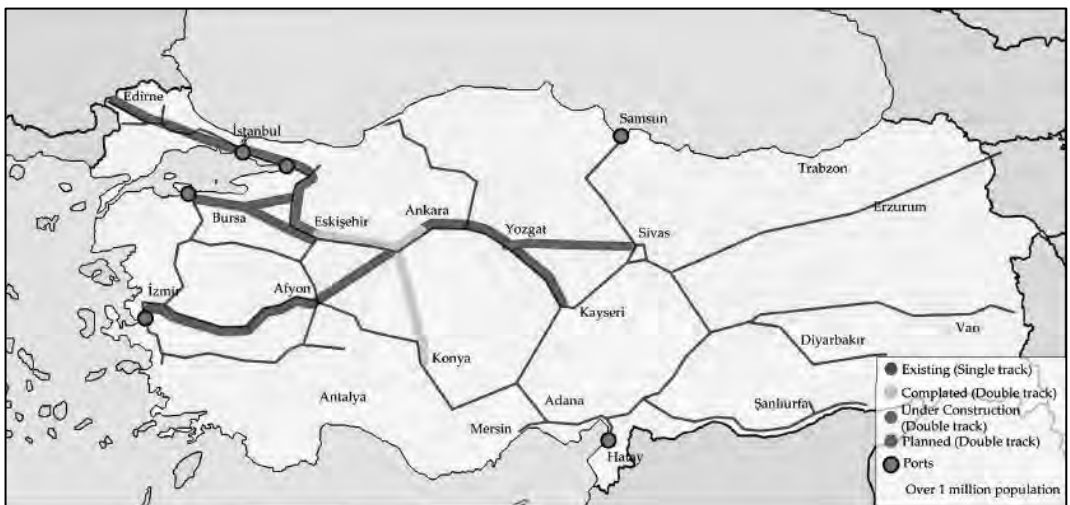


Fig. 3 Railway infrastructure in Turkey (2013)

Currently, TCDD is the only one who produce basic products, services and marketing them, and focuses on the public service aspect. There is no separation of accounts between infrastructure management and train operations. However, ongoing affords are directed into leave them into entrepreneur including new conventional, fast and high speed railway lines, operate, expand, renew the railways, ports, wharfs and docks and perform complementary activities related to them to compete the market by separating infrastructure management from train operations and establishing the necessary bodies in accordance with the EU Acquis [2].

After completion of the rail projects in Turkey, Silk road will gain importance and Europe, Asia, especially the Middle-east, and the central end far east Asian country connections will be established as it is seen in Fig. 4 [11].

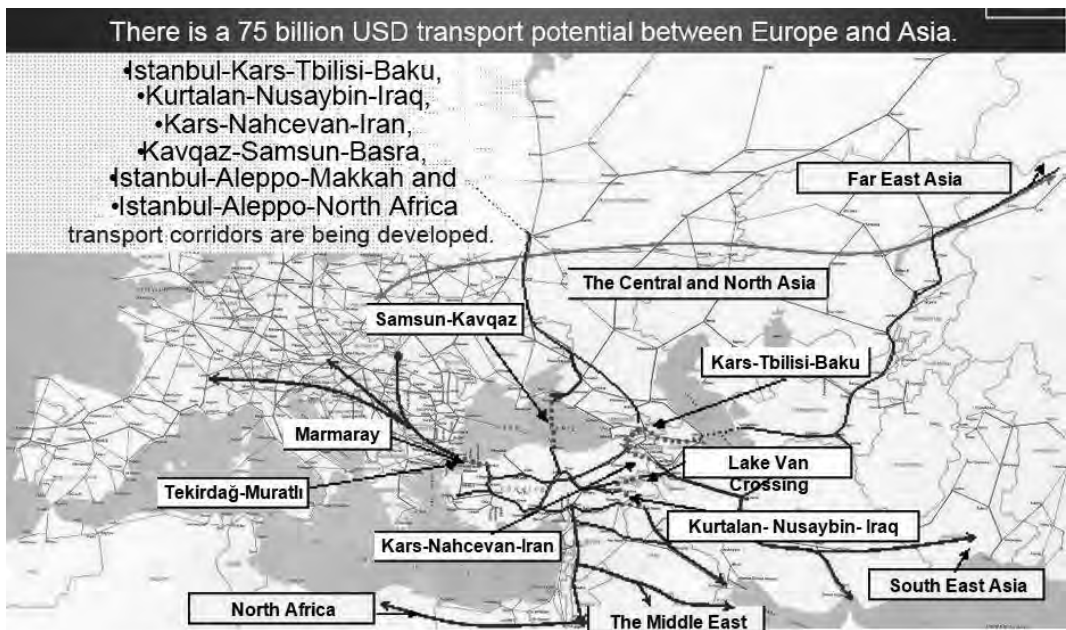


Fig. 4 The scope of Turkish railway and future trade potential (2011)

3.Types of Freight Wagons in Turkish Railways

Fright transportation is not only a part of nationwide trade but also international trade. To maintain both, standardized railway vehicles are needed to overcome interoperability problems of the block trains, which were launched in terms of both national and international transport as of the beginning of 2004 in order to perform faster and more efficient transportation by using our existing transportation capacity the best [8].

The transported goods or material itself determines the wagon type. Moreover, max-axle load is a problem to get rid of the infrastructure problem. Loading and unloading problems according to the material type (e.g. hopper wagons have openable side covers

but cargo space diminishes) should also be considered. Upon handling these problems, Turkey has different kinds of wagon types that are specialized for the kind of the material.

For a more comprehensive approach, it is important to understand freight wagon categories. Freight car identification of International Union Railways on worldwide can be seen in Table 1 and labels on the wagon guidelines is shown in Fig. 5 [9, 10].

<u>LETTER</u>	<u>MODE</u>	<u>MEANING</u>
G	1	Covered wagons of ordinary type
H	2	Covered wagons of special type
K		2-axle flat wagons of ordinary type
O	3	Mixed flat and open high-sided wagons of ordinary type
R		Flat bogies wagons of ordinary type
L		2-axle flat wagons of special type
S	4	Flat bogies wagons of special type
E	5	Open high-sided wagons of ordinary type
F	6	Open high-sided wagons of special type
Z	7	Tank wagons
I	8	Temperature-controlled wagons
U	9	Special wagons
T	0	Wagons with opening roof

“Table 1 UIC Freight car identification codes

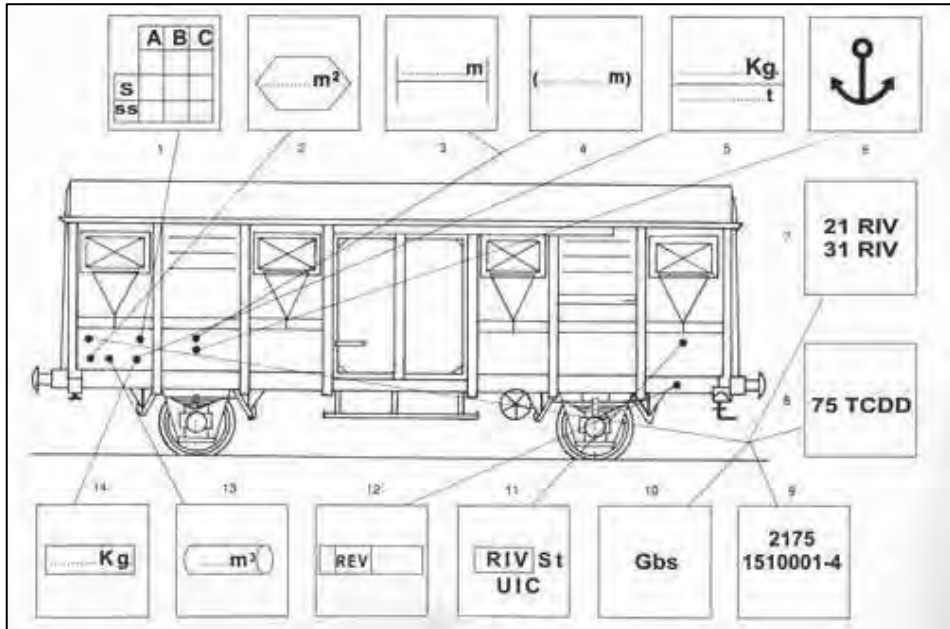


Fig. 5 The scope of Turkish railway and future trade potential (2011)

WAGON CODE	WAGON TYPE	MATERIAL CARRIED
G,H	<u>Covered wagon</u>	All kinds of household wares, kitchenware, clothes, foods, drinks, bagged cements, fertilizers, livestock, etc. are transported in covered wagons.
Habis	<u>Covered wagon with sliding side wall</u>	Platted goods, etc. are transported.
E	<u>High sided wagon</u>	Coal, all of the mine ores, bricks, roof tiles, ron, pipes, sand, and sugar beet are transported on normal type high side flat wagons.
K,R	<u>Platform wagon</u>	Passenger cars, pick-ups, trucks, buses, heavy construction equipment, agricultural machines, and concrete, iron and wooden poles are transported on normal type platform wagons.
S	<u>Platform wagon</u>	Containers, tanks, heavy construction machines, semi-trailers, etc. are transported on special type platform wagons.
F	<u>High sided wagon (special)</u>	Coal and all of the mine ores are transported on special type high side flat wagons. They are equipped with a special unloading mechanism on sideways.

Ug	<u>Grain wagon</u>	Bulk grains are transported on grain wagons. Grain is loaded from above and automatically unloaded from below.
Z	<u>Tank wagon</u>	All kinds of fuel-oils are transported in tank wagons that are designed for liquid transportation.
Uaais	<u>Heavy duty wagon</u>	They have transport capacities of 120 tons, 180 tons, and 250 tons. Heavy and bulky cargos like transformers, generating sets, reactors are transported.

“Table 2 Turkish freight car fleet with UIC Codes

Other than mentioned In Table 2, TCDD can design a wagon and route according to some specific cargo by means of tonnage and special conditions [5].

4.Conclusion and Remarks

Main characteristics and technical specifications of Turkish railway freight wagons and their specifications like dimensions, bogie type, construction materials and unloading mechanism etc. are given in this research. Although these wagons have some similarities they are separated from each other by dimensions, bogie type, construction materials and unloading mechanism etc.

As a developing country, Turkey has an aim for a decade of future about national products also in railways. Although most of the infrastructure is single line, Turkey currently can produce and make the maintenance of both locomotives and freight wagons. Some freight wagons make it able to transport cargos almost 200 tons. Concurrently different type of freight wagons allows variety of cargos like fragile to ore, grain to vehicles.

All in all, having such a railway fleet is something that has already maintained by Turkey but what about standardizing, testing and interoperability, remains a question for now but with the new Turkish vision that is focused on both railway infrastructure and with the presence of Europe’s largest test center project in Eskisehir, seems no big trouble awaits in the near future.

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Summary

FREIGHT WAGONS IN TURKEY: A COMPARATIVE STUDY

This research includes an overview of most common freight wagons and a detailed investigation of different carriages that are used in Turkey by making a brief comparison of railway technology between Turkey and other countries. The investigation includes the current development of Turkish railways compared to road transportation during more than a decade. Concurrently, the paper examines transport needs, which is planned to be highly improved in the near future by means of railway transportation, strategically, due to 75 billion dollars of potential between Europe and Asia. Throughout this research, not only structural information like carriage types, structure of their bodies, floor types, special equipment presence and suitable cargo types but also a contemporary comparison, in the light of the data provided by Organisation for Economic Co-operation and Development (OECD) and Turkish State Statistics (TUIK), of Turkish transportation capabilities with its past and other countries are told.