



Sustainable, safe and
economically feasible
energy concepts and
technologies for
European Inland
Shipping

Teaching Note

Case Study IMST: Giant tires transport strategy

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Content & Target Group

The study case refers to a company from Romania which produces giant tires. The company has to deliver its products to Tosno (Russia), Korbach (Germany) and Houston (United States of America) in order to fulfill the customer's orders. According to the contract, the transportation of goods from the producer to the beneficiary/end-user is an obligation of the seller.



Fig.1 Giant tires for Non Road Mobile Machinery (Source: Eurotire Manufacturing)

Transport systems face requirements to increase their capacity and to reduce the costs of movements. The company has to deliver the products and company management faces several technical issues in regard to the overall dimension and the weight of the tires. Some special products cannot be transported by truck. Logistic department has to determine the best technical solution for transporting the products to the customers.



Fig. 2 Loading the giant tires (Source: Eurotire Manufacturing)

The aim of this case study is to develop a sustainable distribution strategy for giant tires from the production site in Drobeta Turnu Severin (Romania) to the customers in the Ukraine and Turkey.

Tasks for students include:

- the examination of the Trans-European transport network (TEN-T) as well as its connections to third countries,
- the analysis of given information, such as technical data sheets and/or sales and operations planning forecasts,
- the understanding of different modes of transport and
- the conception of multimodality, which requires the understanding of the applicability of different modes of transport to carry different goods

Furthermore students should be able to present their solutions in plenum, during a 20 minutes presentation followed by a discussion (10 minutes). During the case study students have to exchange their knowledge with foreign students via an online-Blog.

Target Group

The case is primarily recommended for master students. The target group consists of 3 teams of 4 master students from the University of Craiova, Faculty of Mechanics, Department Engineering and Management of Technological Systems Drobeta Turnu Severin, specialization Management of the Logistic Systems.

Learning Aims

The aim of this case study is to develop a sustainable transport strategy of giant tyres from the production site in Drobeta Turnu Severin (Romania) to the customers in Ukraine and Turkey. This includes:

- the examination of the European transport network TEN-T as well as its connections to third countries,
- the analysis of given information, such as technical data sheets and/or sales and operations planning forecasts,
- the understanding of different modes of transport and the conception of multimodality, which requires the understanding of the eligibility of different modes of transport to carry different goods

After the course students

- will have knowledge about the important traffic routes in Europe and the classification and on the main traffic routes in Europe
- are able to plan a transport taking into account several factors as freight, transport modes and logistic issues,
- are familiar with port regulations, taxes and documents
- have the ability to explain the basic characteristics (i.e. environmental impact, infrastructure, commodity groups & markets, timing), the advantages and the disadvantages as well as the applicability of European rail, road, inland waterway transport and multimodal transport of the considered cargo type

- are able to formulate a well-organized and eco-friendly transport strategy on a real-life case basis

Tasks

Students have to:

- identify the advantages and disadvantages of each transport mode and compare the transport modes when it comes to the transport of giant tyres,
- develop a sustainable transport strategy for giant tyres on the transport route from Romania to the Ukraine and Turkey, as mentioned in the case. Therefore students have to consider economic and ecological factors and, wherever possible and/or necessary, combine the modes of transports.
- Create a well-structured presentation of 20 minutes (plus 10 minutes discussion) to introduce the transport strategy and argue the decisions that have been taken, e.g. why the use of a certain mode of transport is recommended. Explain the main findings you discovered during working out the case study. Use one slide for your explanations and one slide for proposals.

Analytical Framework

The analytical framework study consists in acquiring, by the students before the case study, the necessary knowledges regarding two issues: legal system and freight transport systems. These are basic knowledges and they are related to specific regulations and terms, main transport corridors, modal share of the transport systems in Europe. Based on this analysis, students need to develop new approaches by evaluation and synthesis and to merge them to a holistic transport strategy. Working as a group, the students will improve their communication skills and they will learn how to work in a team. Finally, the transport strategy is being presented during a 20 minutes presentation by the students, which is accompanied by a 10 minutes discussion.

Structure

The course will take place in four different locations:

- University of Craiova - IMST Department Drobeta Turnu Severin,
- Romanian Naval Authority,
- Port of Drobeta Turnu Severin and
- Eurotires Manufacturing.

The teaching activities will be divided as followed:

Day 1 and 2

In the beginning, the students will go to Eurotire Manufacturing for a technical visit. The visit will be hosted by the commercial director of the company and responsible for logistics issues. They will present the manufacture chain (from raw materials to final product) and some general data regarding the transport and logistic issues. Then, the students will have the first lecture and each team will receive a case study for the transport of different types of tires in different locations.

The next day the students will receive questionnaires, and then they will have the opportunity to ask questions regarding their cases. Until the next lecture, the students will perform self-study in order to be able to develop the transport strategy.

Day 3 and 4

The students will visit the Port of Drobeta Turnu Severin which is a trimodal port where three different transport systems are combined: inland waterway, railway and road transport. A presentation with logistics in ports will be presented by an expert in port operations. On the second half of the day, the students will receive information from the professors at University of Craiova - Dep. IMST Drobeta Turnu Severin. After the lecture, the students will meet a representative of the Romanian Naval Authority who will present specific information regarding the legal framework of the transportation on inland ships. After the second lecture, the students will continue to develop the transport strategy and they will start the preparation of a powerpoint presentation.

Day 5

The last day of the course will consist in the preparation of the case study and presentation of the result. The final evaluation of the student’s performance will be performed in two section: presentation of the results (20 minutes followed by a 10 minute discussion) of the case study and a written test.

Data Analysis

Technical data sheets of products:

Case study: Team 1: Transport strategy from Drobeta Turnu Severin (RO) to Tosno (RU)

Tire Size	21.00R33	Rolling Circumference (mm/in)	5,937/233.7
Rim Size / Flange (in)	33x15.00 / 3.0	Maximum Speed (kph / mph)	50/30
Star Rating	2*	Overall Diameter (mm / in)	1,990/78.3
Tread Pattern	ETRAC	Overall Width (mm / in)	590/23.2
TRA Tread Code	E4	Static Loaded Radius (mm / in)	915/36
Tube Type	T/L	Static Loaded Width (mm / in)	622/24.5
Load Index/Speed Symbol	200/B	Minimum Dual Spacing (mm/in)	701/27.6
Tread Depth (mm / 32nd)	58/73	O Ring Type	333T
TKPH / TMPH (for T-5 Compound)	280/192	Smart Tire Ready	optional

All Steel Radial Tire Load & Pressure Table									
Size	Unit	Under Rated Load			Rated Load	Over Rated Load			Maximum Allowed Load
21.00R33** ETRAC	kgs	12,850	13,200	13,600	14,000	14,210	14,490	14,700	14,980
	lbs	28,300	29,100	30,000	30,900	31,364	31,982	32,445	33,063
	kpa	625	650	675	700	725	750	775	800
	psi	91	94	98	102	105	109	112	116

Fig. 3 Technical specs of 21.00R33 (Source: Eurotire Manufacturing)

Case study: Team 2: Transport strategy from Drobeta Turnu Severin (RO) to Korbach (D)

Tire Size	33.00R51	Overall Diameter (mm/in)	3042/119.8
Rim Size/Flange (inches)	51x24.00/5	Static Loaded Radius (mm/in)	1401.6/55.2
Star Rating	2*	Tread Depth (mm/32nds)	89/112
Tread Pattern	EROCK	Minimum Dual Spacing (mm/in)	1074/42.3
TRA Tread Code	E4	O Ring	451T
Load/Speed Index	235/B	Maximum Speed (kph/mpg)	50/30
Inflation Pressure (Bar/kPa/PSI)	7/700/102	Compound	T-3, T-5, T-7
Weight (kgs/lbs)	/	Revs Per Kilometer/Mile	110/177
TKPH/TMPH	675/462	Overall Width (mm/in)	942/37.1
Rated Load per Tire (kgs/lbs)	38750/85500	Static Loaded Width (mm/in)	1062/41.8

Fig. 4 Technical specs of 33.00R51 (Source: Eurotire Manufacturing)

Case Study: Team 3: Transport strategy from Drobeta Turnu Severin (RO) to Houston (USA)

Tire Size	27.00R49	Overall Diameter (mm/in)	2700/106.3
Rim Size/Flange (inches)	49x19.50/4	Static Loaded Radius (mm/in)	1249.8/49.2
Star Rating	2*	Tread Depth (mm/32nds)	75/95
Tread Pattern	EROCK	Minimum Dual Spacing (mm/in)	892/35.1
TRA Tread Code	E4	O Ring	349T/449T
Load/Speed Index	223/B	Maximum Speed (kph/mpg)	50/30
Inflation Pressure (Bar/kPa/PSI)	7/700/102	Compound	T-3, T-5, T-7
Weight (kgs/lbs)	/	Revs Per Kilometer/Mile	124/200
TKPH/TMPH	500/343	Overall Width (mm/in)	740/29.1
Rated Load per Tire (kgs/lbs)	27250/60000	Static Loaded Width (mm/in)	825/32.5

Fig. 5 Technical specs of 27.00R49 (Source: Eurotire Manufacturing)

Evaluation

The students' performance is evaluated by a rubric, a scoring table, which is provided with the case documents. The table features three different criteria that refer to the transport strategy as well as to its presentation. These criteria need to be evaluated by the instructor(s) and are:

- Quality of research,
- Structure of presentation,
- Organization of arguments,
- Feasibility of solution presented,
- Intra-group dynamics,
- Evidence of consideration of all case factors,
- Multiple resolutions of the same scenario issue.

To simplify and objectivize the evaluation process, scoring is done by referring to qualitative statements that apply to each criterion. Every statement is linked to a number. The final score is obtained as the sum of the numbers.

Additional Information

Any additional information that can help the students to develop the transport strategy can be found at university library and online digital database with scientific papers as well.