

# RAIL EDUCATION IN NORTH EAST

*Marin Marinov<sup>1</sup> NewRail, Newcastle University, Stephenson Building, Newcastle upon Tyne, NE1 7RU, UK, email: [marin.marinov@ncl.ac.uk](mailto:marin.marinov@ncl.ac.uk)*

*Anna Fraszczyk, NewRail, Newcastle University, Stephenson Building, Newcastle upon Tyne, NE1 7RU, UK, email: [anna.fraszczyk@newcastle.ac.uk](mailto:anna.fraszczyk@newcastle.ac.uk)*

## ABSTRACT

This paper discusses the needs for proper rail education and teaching. More specifically this paper includes a brief discussion on the need for a skilled and motivated workforce for a vibrant rail sector in Europe, followed by a presentation of innovative rail focused Masters' course and intensive railway programme in North East. The paper concludes with the argument that rail industry expectations can be met through international cooperation in rail education and joint degree programmes.

*Keywords: EU railways, rail education, teaching, innovation, research.*

## EU RAILWAYS: A SKILLED AND MOTIVATED WORKFORCE

30 January 2013 the European Commission adopted its 4<sup>th</sup> Railway Package to further revitalise the European Railways through competition and efficiency in the sector (MEMO 2013). Four key areas have been identified:

1. Standards and EU wide approvals;
2. A structured domestic passenger liberalisation;
3. Independent and transparent infrastructure management to allow more access to the European railways;
4. A skilled and motivated workforce for a vibrant rail sector.

For the purposes of this discussion we will focus on the fourth area, namely a skilled and motivated workforce for a vibrant rail sector. Specifically, as also mentioned in other EU policy documents, it has been realised that the European Railways can improve their performance levels through proper rail education and training. In the 2007 Freight Transport Logistics Action Plan it has been stated that "In many areas of freight transport logistics there are shortages of skilled personnel. Therefore, the EU will examine measures in close cooperation with social partners to enhance the attractiveness of logistics professions and to encourage mobility of staff across borders", COM (2007).

It is also believed that allowing access to the European rail national and domestic markets will open new opportunities for railway companies/operators (also called "railway undertakings")

and create more jobs. Approximately one-third of EU rail staff will retire in the next 10 years, suggesting that the sector will experience a shortage of skilled personnel. Therefore new workforce will need to be in place to ensure skilled and motivated employees are available to keep serving efficiently passenger and freight traffic in Europe.

The railway systems in Europe are changing. The orthodox methods employing marshalling yards are no more. Innovation is key. Reduction of complexity is imperative for railway undertakings to experience improvements. New generation of rail service is associated with the implementation of new generation of information and communication technologies. Rail staff has to follow the markets and respond adequately to these changes if efficient service is to be ensured. This situation presents a great opportunity to rail-focused university degree and training programmes.

A collaborative effort within the rail education-focused project RiFLE (RiFLE 2010) studying the current needs for rail higher education has found that skills will be increasingly important in the following areas:

- ✓ Marketing and management;
- ✓ Product and service development;
- ✓ Business processes and commercial activities;
- ✓ Technology and organisation in rail freight and intermodal transport;
- ✓ Information systems and customer services.

The implementation of modern logistics production principles will bring a new flavour to the performance levels of the European railway sector. It has been a commonly held opinion that rail freight has to be cost effective, cost competitive and much more productive in relation to asset management and utilisation of resources. Lean thinking would be of interest here to promote a very different set of imperatives on the distribution of freight focusing on cost-effective value-added principles. If university degree programmes are to produce highly skilled workforce to meet the needs of the Railway sector, they will need to capture these requirements. Innovation has to be introduced in the class room. Innovative teaching and learning methods employing multidisciplinary approaches that promote transferable skills and competences such as creative thinking, research-based problem solving, adaptability and flexibility will build the necessary skills for the railway employee of the future.

## **RAIL EDUCATION IN NEWCASTLE UNIVERSITY**

In response to these opportunities as well as challenges our team in Newcastle University has developed a railway teaching profile that includes innovative learning methods, policies and practices. Subjects such as operations management, analytical and simulation modelling theory and practice, rail project risks and values, lean thinking and logistics are incorporated to form a complete portfolio of studies. Research and teaching go hand in hand making it possible for students and professors to approach the railway system from different angles. Two forms of teaching are currently available:

- A complete MSc course on rail freight and logistics;
- An intensive 3-week programme in rail logistics.

## **MSc in Rail Freight and Logistics**

Newcastle University's masters programme in rail freight and logistics includes expertise in rail operations management, engineering and freight logistics. Given that the railway system has a multidisciplinary nature, the course takes a multidisciplinary research-based block teaching approach to meet the needs and expectations of candidates from a variety of educational backgrounds. Teaching staff includes a good mixture of academics and practitioners. Specifically, the following modules are available on the programme:

- Rail Systems & Research Skills;
- Rail Freight Operations;
- Rail Project Risk and Value Management;
- Freight Transport Logistics;
- Rail Management, Economics and Planning;
- Multi-modal Freight Policy and Practice;
- Railway Environment and Energy;
- Rail Safety and Security;
- Rail Planning and Time-Tabling;
- Rail Vehicles;
- Rail Infrastructure;
- Major Rail Project.

“Rail Systems & Research Skills” and “Major Rail Project” are the absolute milestones of the programme, therefore are intimately connected. The objective of the module on “Rail Systems & Research Skills” is to discuss research methods and methodologies developed to solve rail logistics managerial and engineering related problems. Students are then invited to choose a rail logistics related problem and a research methodology to be applied to solve this particular problem, which outlines the scope of the student's major rail project and identifies the project supervisor.

The learning outcome from the Masters' course is a sound understanding of rail management, engineering and logistics concepts, operations, economics, technologies and policies and practice, with a focus on efficient freight distributions.

Students are required to support and reinforce lecture-based knowledge transfer through guided independent studies by making use of recommended sources, references, scientific papers and web-based material.

Small group teaching activities provide the opportunity for any lecture material to be discussed and supplemented. Hence the students gain knowledge and understanding via group discussions and buzz sessions, which provide a mechanism for collection and analysis of detailed feedback on the levels of understanding of the specific rail logistics-related problems. Technical visits and research-based learning through observations associated with fieldwork consist an important part of the programme making it possible for students to develop a more comprehensive understanding of the complexity of the rail logistics system as a whole.

The Masters' course incorporates the strategic focus of EUROPE 2020: education, research and innovation, where a special emphasis is placed on the requirement of submitting outcomes of good quality from group and individual assignments demonstrating clear and logical presentation, COM (2010).

The research methods and methodologies employed in every study will need to be explained rationally, so that the planning, organisation and execution of group and individual assignments undertaken during the degree programme ensure the development of a highly

skilled workforce for the needs of a modern and vibrant railway sector, impacting positively on career development and professional growth.

### **Intensive Railway Programme in Newcastle upon Tyne**

Newcastle University runs an Intensive Programme in Rail and Logistics funded by the European Commission for three weeks in June/July. Its innovative approach involves short open lectures on rail and logistics-focused topics, group research projects, technical visits and workshops as well as technical seminars. The intensive programme (IP) employs 20 professors from 10 countries and accommodates more than 50 students on average.

The IP is designed with an emphasis on modern rail freight and passenger services as well as international aspect of logistics. Specifically, we learn about safer and more secure rail transport systems, more mature and environmentally friendly distribution of freight, and more efficient railway operations as well as international multi-modal transport policy and practice. The experience from the IP has been deemed as magnificent. Further to this our students said:

*“... we appreciated every part of it. Thank you so much for everything, for organizing such a successful educational event, as we learned many things, we explored beautiful corners of England and increased our interest in railways”.*

(RailNewcastle, 2012)

Based on the feedback collected after the IP, we are certain; the IP provides a fruitful environment for the development of a skilled and highly motivated workforce. 75% of students, from the total group of 49 European students, judged academic/learning outcomes as ‘excellent’ or ‘very good’, as shown in Figure 1.

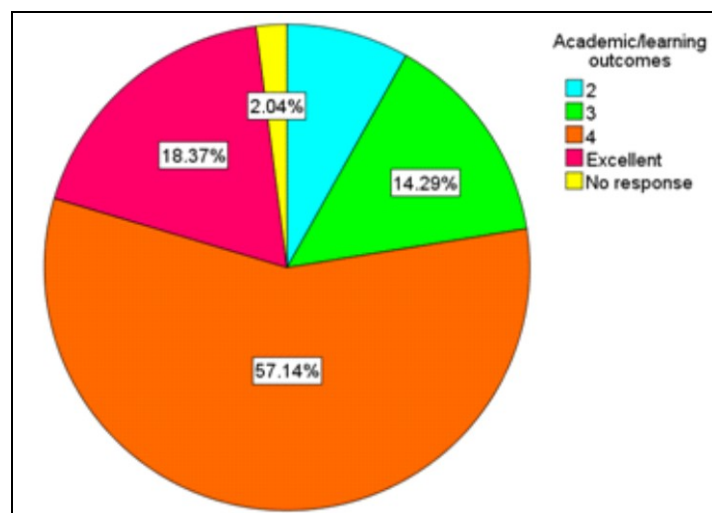


Figure 1: ‘How would you judge the academic/learning outcomes of the IP?’

Source: RailNewcastle (2012)

83% of students said they were satisfied with their group research projects and nearly 70% of students said they improved their English.

The multicultural and multidisciplinary approach employed within the context of the IP has also encouraged teaching staff to reassess their performances through comparison with the performance of their colleagues in the class room. Measures for improvements have been identified and discussed broadly.

The IP has also been recognised by the British Council. A one-page article has been published on the British Council's webpage presenting in a concise way the merits of the IP (BC, 2012). Specifically, it has been recognised that a new capacity for action in rail logistics education has been built through a sound cooperation at international level.

## **LOOKING TO THE FUTURE**

Driven by the need to understand and meet the future industry expectations, we aim to grow and keep improving our university degree programmes through international collaborations. Internationalisation and opportunities for joint ventures are drivers for establishing and running joint degree programmes.

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