

Necessities for Future High Speed Rolling Stock



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The report "Necessities for future high speed rolling stock"

UIC High Speed contributes to the logical development of high speed rail systems around the world. Producing reports is one of our activities which includes producing statistics, and organizing meetings, conferences, and workshops. The report "Necessities for future high speed rolling stock" is such a product requested by UIC members, and this brochure introduces the report.



What is the purpose of the report?

The railway sector is undergoing major change both in Europe and the rest of the world. These changes include the relationship between railways and industry, inter modal competition, interoperability, liberalization of railway passenger traffic in 2010 and the prospect of future development of High Speed in the USA, South America, the Middle East, India and elsewhere. This situation raises the needs to think what is necessary for planning and designing future high speed rolling stock.

This report covers all topics in designing and planning high speed rolling stock, and gives ideas which should be taken into account for future high speed rolling stock. This will be used as a list of taking into account during the life of rolling stock.

Contents

1 General Issue (mainly in business aspects)

-The change of railway business environment such as liberalization, competition and globalization gives impacts on the business around rolling stock. What will be paid attention in each business processes: development, design, procurement, approval, deployment and maintenance?

-How long does the whole process take?

-There are other general issues to be considered for rolling stock management. Life Cycle Cost (LCC), Reliability-Availability-Maintainability-Safety (RAMS), Standardization and Modularity, Compatibility with Infrastructure
What should be taking into account in these general issues?

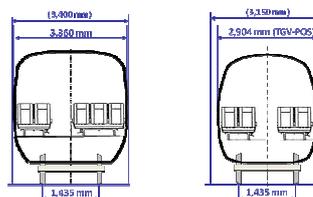


2 Basic technical aspects

What are the basic technical aspects which should be taken into account?

-What the basic dimensions should be?

Track Gauge (Broad gauge or narrow gauge is possible?), Loading gauge (strongly affect on the capacity), Axle load (strongly affect on the infrastructure), Train length, Car length, Distributed or Concentrated power (advantages and disadvantages), Articulated or Non-articulated formation (advantages and disadvantages), Double decker trains (increase capacity?), Floor height, Ceiling height



-What will determine Running Performance?

Maximum speed (400km/h?), Acceleration and deceleration (strongly related to the operation needs), Current collection (is it an issue only for rolling stock?)



-What should be considered for Safety?

Running stability, Signalling, Communication, Crash resistance (designs to prevent of loss of life), Fire safety, Crosswind resistance, Security, Derailment

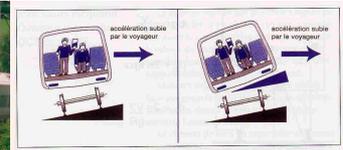


-What should be considered for Environmental issue?
 CO2 emission and energy consumption (what is key technology?), EMC, Noise (problematic in case of speed increase), Ground vibration , Life Cycle Assessment (need all analysis of whole life)

-What would be the issue in Aerodynamics and what should be done for them?
 Aerodynamic resistance (what is the key?), Tunnel micro-pressure waves (noise problem around tunnel portal), Pressure fluctuation from passing trains running through tunnels, Flying ballast (acknowledged in recent experience), Riding comfort by aerodynamic fluctuation



-What is the topic for increasing Comfort?
 Ride comfort (what are key points), Noise abatement in the passenger saloon, Tilting system, Airtight structure (crucial in case of tunnel running), Air conditioning, Extreme climatic conditions (this is not only for comfort but for reliability)



3 Commercial and human factors

-What are the main topics for commercial and human factors?
 Ergonomics (human-machine interface), Accessibility for Person Reduced Mobility (more and more important for future rolling stock), Driver desk and cab design, Cabin design, Passenger service



-What should be considered for Cabin design?
 Capacity (most concerned for commercial point of view), Seating (seating and service category, Flexible seating, Seat dimension. These depends on the commercial policy), Windows (how large the size is?), Doors (what should be the optimum?), Toilets (what should be considered for keep comfortable), Luggage storage space, Easy cleaning concept, External design image



-What should be considered for Passenger service?
 Information network (what will be the future?), Catering service



4 Other technical aspects

-Are there any other technical aspects to be considered?
 Body and bogie structure (material and structure), Power and braking system (system and device), On board train control and information system (huge possibility of effective train control and effective train management), Auxiliary power units (what should be considered for future system?), Compressors, Automatic coupling system



*In this report, the high speed rolling stock can generally be defined as the rolling stock running on special railway system for high speed (dedicated line or upgraded conventional line) and running at least at the speed of 200km/h. Magnetic Levitated Vehicle is not considered.



**This report was drafted and edited by the support of plenary committee member of UIC High Speed and many other people who took part in brainstorm meeting for the report.

The complete report is available on the UIC website
<http://www.uic.org/highspeed/>



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