EURAILmag

BUSINESS & TECHNOLOGY

THE MAGAZINE FOR EUROPEAN RAIL DECISION MAKERS AND CUSTOMERS

REGIONS HAVE THEIR SAY WITH REGIOLIS

BOOSTING PAINTING EFFICIENCY
ENHANCED METHODS & EQUIPMENT

WI-FI ON TRAINS SPREADING
FROM EUROPE ACROSS THE WORLD

RCAS RAIL COLLISION AVOIDANCE SYSTEM

ERTMS SAFETY & PERFORMANCE
A STATISTICAL APPROACH

EUROPEAN LEGISLATION, STANDARDS & RESEARCH

RUSSIA RAMPS UP & SOCHI IN TRAINING

Issue 23 - www.eurailmag.com
Europe: €26 - Outside Europe: €32

THE MAGAZINE FOR EUROPEAN RAIL DECISION MAKERS AND CUSTOMERS

EURAILmag

BUSINESS & TECHNOLOGY

EURAILmag is published by BLUE LINE & Bro
78, av. de la République
75011 - Paris - FRANCE
RCS Paris B 449 620 657

Tel: +33 1 40 21 08 68
Fax: +33 1 40 21 09 61
Web: www.eurailmag.com
Email: contact@eurailmag.com

To contact the following departments, please dial +33 1 40 21 plus the extension number:

Publication:	05 77
Editorial:	48 46
Advertising:	48 42
Design:	48 43
Promotions:	48 48
Production:	48 42

Subscription: 1 year/2 issues
Europe €52 / Worldwide €64

Please send full contact details and payment to:
EURAILmag subscriptions
78, avenue de la République
75011 - Paris - FRANCE
subscription@eurailmag.com

Subscriber names and contact details are used internally and by organisations contractually linked to BLUE LINE & Bro.

Original design: Frédéric Pérat

Printed in France
by Groupe RICCOBONO,
83490 Le Muy

Cover photo ©Fotolia

E D I T O

Local to european

TERRITORIAL COLLECTIVITIES ARE INCREASINGLY CONSCIOUS OF THE NOTION OF SUSTAINABLE DEVELOPMENT AND THE NEED TO CONSOLIDATE LOCAL ECONOMIES, AS WELL AS BOOSTING THEIR APPEAL. THEY ARE RIGHTLY CONCERNED THAT LIMITED RAIL LINKS RISK DEPRIVING THEM OF ACCESS TO EUROPE'S RAIL FREIGHT NETWORK. IN THIS CONTEXT, THEY ARE KEEN TO ADOPT INITIATIVES TO RECLAIM FREIGHT TRAFFIC BY WAY OF COOPERATION. THERE IS A NEED TO CLEARLY DISTINGUISH TWO LEVELS OF RAIL ORGANISATION THAT SHOULD BE MADE TO FUNCTION HAND IN HAND – ONE THAT IS HIGHLY INDUSTRIALISED AND FAVOURS GROWTH IN RAIL PRODUCTIVITY AT A EUROPEAN LEVEL. AND ANOTHER, MORE FIRMLY ESTABLISHED AND 'CLOSER-TO-HOME', TO ENSURE MAXIMUM FLEXIBILITY AND THE SEAMLESS FLOW OF LOCAL TRAFFIC. THESE STRUCTURES HAVE YET TO SEE THE LIGHT OF DAY IN THE CURRENT EUROPEAN FRAMEWORK, STILL CHARACTERISED BY A WIDE DIVERSITY OF TERRITORIES AND ACTIVITIES. THE IDEA IS TO ENCOURAGE GREATER PROXIMITY BETWEEN RAIL TRANSPORT AND SECTORS OF ACTIVITY, ENCOURAGING MORE PARTNERSHIP-ORIENTATED APPROACHES TO BOOST THE RELIABILITY OF OFFERS AND PRODUCTIVITY OF RAIL RESOURCES. THE NOTION OF A LOCAL RAIL OPERATOR WITH A STRONG FOOTHOLD IN THE LOCAL ECONOMY IS STARTING TO TAKE HOLD. SUSTAINABLE DEVELOPMENT HAS BECOME MUCH MORE THAN JUST A CONCEPT TO SEDUCE THE MEDIA AND THE PUBLIC. COMPANIES ARE WELL AWARE THAT UNDER THE GROWING PRESSURE OF PUBLIC AND CONSUMER OPINION, PLUS THE IMPACTS OF DEVELOPMENT ACROSS THE GLOBE, SOONER OR LATER ECONOMIC PLAYERS ARE GOING TO FEEL THE SQUEEZE. AND THIS 'SQUEEZE' IS LIKELY TO OPEN UP NEW MARKETS. INDEED ANTICIPATING THESE CHANGES MAY WELL PROVE A SMART STRATEGIC DECISION. HENCE THE REASON MANY COMPANIES ARE KEEN TO BE WELL CONNECTED TO THE RAIL FREIGHT OFFER, PARTICULARLY SINCE IT IS DRAWN TOWARDS NETWORKS SUPPLYING EUROPE'S ECONOMIC SPACE. THE RISK OF PART OF THE REGIONAL TERRITORIES BEING SIDELINED FROM EUROPE'S RAIL SCENE IS ONLY TOO REAL. AND SO AWARENESS IS GROWING AMONG LOCAL ACTORS OF THE IMPORTANCE OF STEPPING UP THE NUMBER OF TRAINS OPERATING ON THEIR NETWORKS TO KEEP THEIR ECONOMIES IN GOOD HEALTH. AT THE SAME TIME SUCH A MOVE WILL ALSO ENCOURAGE A WELCOME MODAL SHIFT FROM ROAD TO RAIL. THE RECOVERY OF RAIL FREIGHT IS AN ECONOMIC ISSUE FOR ALL COMPANIES, WHICH WILL OTHERWISE CONTINUE TO STRUGGLE TO SURVIVE WITHOUT THE LIFELINE OF ACCESS TO EUROPE'S NETWORK. IMPORTANT TOO, IF THE SECTOR FINDS ITS FEET AGAIN, SOCIETY AS A WHOLE IS SET TO REAP THE BENEFITS ■

Jean-Yves Jadot

EURAILmag
BUSINESS & TECHNOLOGY

ISSUE 23
2011 FIRST HALF YEAR

SUMMARY [1/2]

12

30

84

98

SUMMARY [2/2]

EURAILmag
BUSINESS & TECHNOLOGY

ISSUE 23
2011 FIRST HALF YEAR

120

124

172

178

BOARDING FOR ALL

REGULATIONS IN THE EUROPEAN UNION (EU) REQUIRE THAT PUBLIC TRANSPORT SYSTEMS BE ACCESSIBLE FOR EVERYONE, WITHOUT ANY RESTRICTIONS FOR PEOPLE WITH REDUCED MOBILITY (PRM). THIS DOES NOT ONLY REFER TO DISABLED PEOPLE, BUT ALSO THE ELDERLY, PASSENGERS WITH BABY CARRIAGES, BULKY LUGGAGE ETC. IN OTHER WORDS, ALL TRAVELLERS WITH SOME KIND OF REDUCED MOBILITY. WITH THIS GOAL IN MIND, THE CONSORTIUM BEHIND **PT4ALL**[1], A R&D PROJECT FUNDED BY THE EU'S 7TH FRAMEWORK PROGRAMME, IS WORKING IN THE FIELD OF BOARDING ASSISTANCE...

Fig.1. Uneven boarding: gaps and different levels between vehicle and platforms to be bridged, left, Usedomer Bäderbahn[2]; right, S-Bahn Berlin

THE EU regulations aim to make accessibility a future obligation for railway operators. And here one of the greatest obstacles to overcome, particularly for wheelchair users, is the interface between the platform and rail vehicle. Most of the latter require special boarding devices in order to provide sufficient accessibility. To advance the current situation, PT4All will develop an improved and retrofitable boarding assistance system for use not only by wheelchair users, but also by all other groups of PRM.

The research methods applied in this 39-month project, which kicked off at the end of 2009, involved conducting one-to-one interviews with experts across Europe. The interviewers, themselves experts in the field of accessibility, talked with:

- key representatives of rail operators, e.g. the U.K.'s Association of Train Operating Companies (ATOC), 'Accès Plus' (SNCF, France), 'Travelling without Barriers' (Austrian Federal Railways / ÖBB Barrierefreies Reisen)
- representatives from user groups such the U.K.'s Disabled Persons Transport Advisory Committee (DPTAC)
- professional, passenger assistance organisations offering accompanied services throughout the whole journey, e.g. 'Les Compagnons du voyage' (SNCF & RATP, France), and
- stakeholders, e.g. the Department for Transport (DfT) in London

The aim was to discover their professional experiences and personal views, plus gain in-depth feedback on practical use of the various boarding assistance systems in service across Europe. Quantitative research methods were also applied. These included:

- conducting a survey among 5,000 rail customers to better understand the basic needs of PRM
- the experiences of various European railway regions faced with different operating conditions within their specific rail environment, and
- research on the daily use of various different types of Boarding Assistance Systems (BAS) in Europe.

The process of boarding rail vehicles comprises several linked steps: passengers must arrive at the rail station; they must reach the platform; finally, they must switch from the platform onto the rail vehicle. Once on board they require appropriate space to travel plus access to various services. The process of alighting follows the same steps in reverse. PT4All focuses on the difficulties faced by PRM when moving from station platform to the train. The main goal of the project is to develop an improved BAS.

MAIN CHALLENGE – EXISTING HIGH FLOOR VEHICLES

The main accessibility problem for rail operators is that most standard trains in service, e.g. UIC-type coaches as well as suburban or tramway lines, have significant vertical differences – often one step or more – plus horizontal gaps between the vehicle and platform. These difficulties within the infrastructure are accentuated by the extremely long service life of both the rail rolling stock and infrastructure. Since operators will use their current fleets for

PT4All consortium

Bombardier Transportation
BDZ Passenger Traffic EOOD (Bulgarian State Railway)
MÁV-START (Hungarian State Railway)
MBB Palfinger
NRIC (Bulgarian National Railway Infrastructure Company)
ÖBB-Personenverkehr (Austrian Federal Railways)
Rodlauer Consulting
Accessibility Business Consulting
Siemens Österreich, Division Mobility
Slovenske Železnice (Slovenian State Railway)
SBB (Swiss Federal Railways)
Belgrade University
VKB (Karlsruhe Transport)
Vienna University of Technology

many years to come, temporary solutions must be found until they are replaced with modern and fully-accessible trains.

CHALLENGES FOR INFRA-STRUCTURE & ROLLING STOCK

The technical and operational environment of a BAS and its required capabilities are included in the scope of PT4All, as well as the important role of an effective and universal retrofit BAS. Both criteria are being evaluated from operators´ and manufacturers´ perspectives, e.g. environmental conditions, time and space required for the operation and installation of the BAS. The main focus is on conventional, heavy rail, high-floor vehicles in service.

It is difficult to develop a 'one-solution-fits-all' boarding device as universal accessibility solution due to the wide variety of rolling stock and differences in platform heights. Even on a single rail line, various types of train are often used and platforms may have different heights and profiles. Moreover, the exact physical dimensions of rolling stock, e.g. height, can also vary depending on its occupancy and wear. Finally, technical accessibility devices must work under all kinds of environmental conditions such as rain, snow, frost, etc.

EVALUATION CRITERIA

This provides an overview of all relevant parameters to be considered when designing a new BAS. Table 1 presents the importance scores used to rank the evaluation criteria, while Table 2 summarises it. Features rated unimportant are omitted.

Table 3 presents the most important technical and operational requirements to be considered when designing a BAS.

Framework requirements	Limits
Total duration for use preparation, use, stowing	< 2 minutes
Platform width	> 130cm
Platform-vehicle **vertical gap**	< 110cm
Access door width	≥ 80cm
Access door resting height from the floor	> 174cm
Capacity (wheelchair)	350kg
Relative platform-vehicle* angle	< 13.2% or 7.5°

**transverse gradient of platform and super elevation of track*

Table 3. BAS technical and operational requirements

IMPROVING ROLLING STOCK ACCESSIBILITY

Boosting accessibility means either creating level boarding by adjusting the platform height to that of the vehicle floor, or providing BAS that enable PRM to reach vehicle floor levels from platforms at different

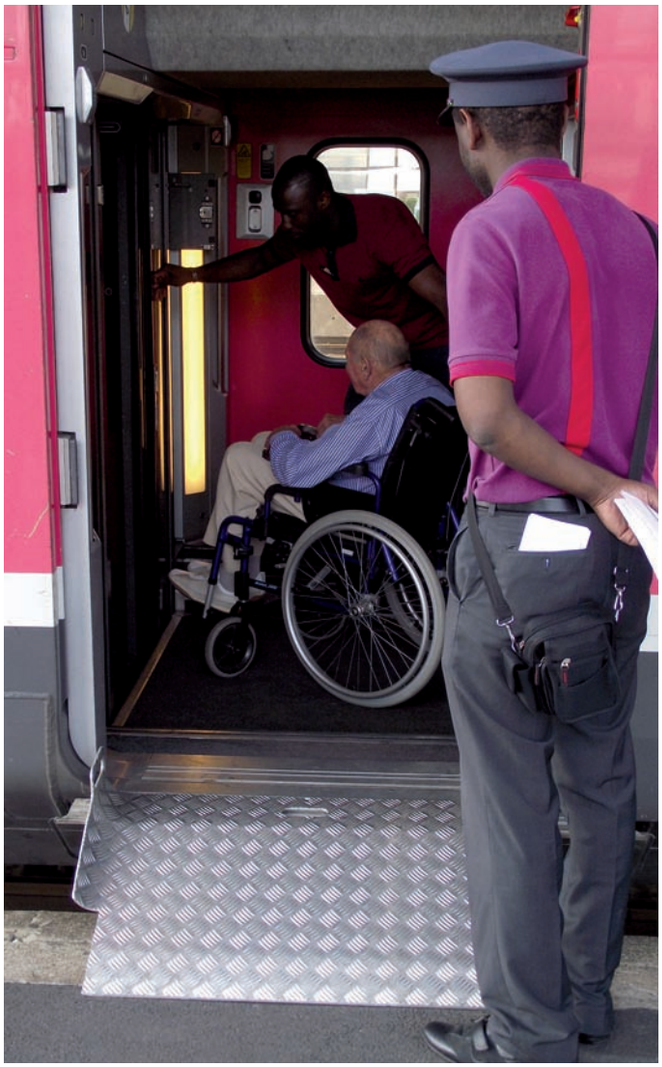
Score	Meaning
1	Very important – critical to successful operation ('must have')
2	Important – high benefit for users and operators ('nice to have')
3	Less important – some benefit for users and operators, but not absolutely necessary

Table 1. Criteria importance scoring

Criteria	Remark	Importance
User		
User with devices	Wheelchair, walking frame, prams	1-2
Physically impaired	Walking disabled, with crutch or sticks, elderly, short people	2
User with special needs	Visual and hearing impaired	2-3
General passengers	Passengers with luggage, children, pregnant women	2-3
Operation without staff	Operation by passengers themselves, automation	2
Operator		
Reliability of BAS	Malfunction prevention	1
Operational quality	Short dwell time, malfunctions must not influence train operations	1-2
Operational effort	Number of staff	1-2
Failure management	Problems easy to solve	1
Manufacturing / Implementation		
Universal	System needs to be universal, retrofitting permitted	1-2
Costs	Costs as low as possible	1
Manufacturing effort	Manufacturing effort needs to be low – especially when retrofitting is involved	1-2
Safety		
Risks	No safety risks to be tolerated	1
Features	Optical and audio signals	1-2
Maintenance		
Effort	Number of staff required, special tool required	1
Costs		2
Sustainability	Recyclability & energy consumption	3
Design appeal		
Optical design	Design appeal is important for customer acceptance	2-3

Table 2. BAS evaluation criteria – overview

Fig. 2. Vehicle-based ramps: above, Southeastern trains, U.K.; below, SNCF France



> "It is difficult to develop a 'one-solution-fits-all' boarding device as universal accessibility solution due to the wide variety of rolling stock and differences in platform heights"

levels. There are two main types of BAS: platform- and vehicle-based.
Platform-based systems are usually simple, manually-operated devices, mainly only suitable and designed according to wheelchair user's specifications and needs. At least one device and one assisting member of staff is needed at each station to operate it. Before the train arrives at the station, the BAS must be moved to the exact position on the platform where the adapted vehicle for wheelchair users is expected to halt.
The advantage of all vehicle-based devices is that they are always available, i.e. at the right time and place and in all stations, because they are stored on board the train. This enables PRM to travel even without having to make pre-travel arrangements. This is extremely important for both the users and the 'accessibility for all' policy of railway operators. On-board conductors are trained to use this kind of boarding equipment, which is more convenient for operators than the platform-based BAS.
For each BAS there are two main technologies – ramps or lifts – and two sources of powering them – manual or electro-mechanical.
A short overview of existing systems typically used for high-floor vehicles is given in Figures 1 to 4. Those for low-floor vehicles, e.g. gap bridging systems, are not covered in PT4All.

Ramps as Boarding Assistance System

Ramps are generally the simplest and least expensive BAS devices. Yet they can only be used for small vertical gaps between vehicle floor and platform (typically one step), otherwise the ramp gradient is too steep to use the device safely or the ramp platform too long to be used on narrow platforms. Most ramps cannot be operated without staff assistance.
There are five different types of ramp-based BAS solutions:

- platform-based manual
- vehicle-based manual
- vehicle-based electro-mechanical
- vehicle-based and platform-based, gap-bridging devices to close horizontal gaps.

Manual ramps – platform-based applications

A mobile ramp is usually located on the station platform and requires staff assistance to be operated. Manual ramps must have an ergonomic design both for the comfort of the wheelchair user and to ensure good operating conditions, e.g. weight and manoeuvrability, for staff. If a BAS is easy to handle, staff will be more willing to use it.
Several rail operators are using manually-deployed ramps for high-floor vehicles too, although ramps do have their technical limits.

Manual ramps – vehicle-based applications

Vehicle-based manual ramps are those located on board. They also require staff assistance to be deployed and used. The advantage here is that they provide accessibility to all stations from the train since they move with it. The ramps may be permanently attached or simply stored.

>> go to p. 22

Fig.3. Platform based lifts used: left, in France SNCF Accès Plus; right, in Spain Atendo

"A KEY ADVANTAGE OF LIFTS IS THEIR FLEXIBILITY. PLATFORM-BASED LIFTS CAN BE ADAPTED TO ALMOST ALL TYPES OF ROLLING STOCK AND STATIONS SINCE THEY CAN BE MOVED AROUND ON THE PLATFORM AND BRIDGE VARIABLE HORIZONTAL AND VERTICAL GAPS"

Figure 2 shows vehicle-based ramps used for bridging horizontal gaps, and vertical height differences where needed.
Lifts are mechanical lifting devices either installed on the vehicle or placed on the platform as mobile units. They are the preferred solution for large height differences (usually more than one step), where slopes are too steep to use ramps.
A key advantage of lifts is their flexibility. Platform-based lifts can be adapted to almost all types of rolling stock and stations since they can be moved around on the platform and bridge variable horizontal and vertical gaps. Similarly vehicle-based lifts can be adapted to many different platform heights accordingly.

Lifts – platform-based applications

These lifts are operated by staff and are usually pushed along the platform to the train door, then manually operated. Similar to manually-deployed ramps, these lifts require ergonomic design, not only for wheelchair users but also for staff manipulating them. Figure 3 shows some examples.

Mechanical lifts – vehicle-based applications

These consist of elevator platforms that are deployed and unfolded from the train, and usually operated by staff.
This BAS provides access where there are differences in platform-to-vehicle floor height (floor-to-ground distance) of 1100mm, which is more than standard, platform-based lifts can manage. Usually this type of BAS requires sufficient platform width to ensure enough space for safe wheelchair roll-on/roll-off, but a little less than platform-based lifts. Lifts for boarding and alighting parallel to the train do also exist.

An additional advantage of vehicle-based mechanical lifts is the possibility of evacuating wheelchair users under exceptional circumstances in the case of an emergency, even without platforms between stations, since the lifts can usually cope with greater floor-to-ground distances than ramps.
Vehicle-based mechanical lifts require an energy source. >> go to p. 24

Fig.4. Vehicle-based lift used by Deutsche Bahn (manufactured by MBB Palfinger)

Spanish rail infrastructure manager **Adif** is carrying out an action plan to make access to railway services fully autonomous for 80% of passengers by 2012. It is foreseen that 100% of services will be accessible by 2014. The main elements of the plan are as follows:

> incorporation of lifts and ramps to establish itineraries adapted for PRM
> higher and longer platforms to facilitate the access of passengers to trains
> adapted pathways between platforms

Atendo

Atendo, a joint initiative by Adif and Spanish operator Renfe, provides assistance for PRM passengers in stations across the country. The personalised service guides, informs and assists disabled passengers in matters of access and transit in stations and offers aid when boarding and disembarking from trains

Two devices must be provided – one on either side of the vehicle. The measurements of the lift platform in a folded, stowing position need to be narrower then the door width. Lifts occupy space at the entrance doors and behind inside the coach, which is a difficult situation in standard UIC coaches since space is at a premium. Figure 4 shows an example of a vehicle-based lift.

Findings from the PT4All research plus relevant European projects were taken into consideration, e.g. European or national regulations, in order to produce a comprehensive overview of recommendations based on existing BAS. For example, analysis of the accessibility situation for UIC coaches shows that there are no existing BAS solutions for passenger trains with doors 800mm wide, which is a very common situation with existing UIC-type vehicles and represents one of the technical restrictions and main design challenges ahead.

OUTLOOK

The first step of PT4All, completed in June 2010, involved developing evaluation criteria for both existing and new BAS to be designed. The second step – compiling a comprehensive research study on existing BAS across Europe and the world – was completed in August 2010. The project will end with an assessment of all these BAS and application of the criteria. The results of activities to date reveal the complexity of developing a universal and standardised BAS solution adaptable to as many types of vehicles and platform conditions as possible.
The project focuses on the most difficult scenarios of accessibility situations for standard UIC wagons, since an effective solution for these vehicles should cover most other types of rail vehicles as well.
An 'Existing Boarding Assistance System Evaluation Matrix Report' has been compiled to assess existing solutions. Another task includes drawing up recommendations and requirements for new BAS for existing UIC-type vehicles. This is being carried out by the Prototype Development Group comprising Vienna University of Technology and University of Belgrade, as well as industrial manufacturers from MBB Palfinger, Bombardier Germany and Siemens Austria. A final prototype solution will be presented at InnoTrans in 2012 ■

Benjamin Petutschnig
Research Centre for Railway Engineering
Vienna University of Technology
Assoc. Prof. Dr. Goran Simic
Faculty of Mechanical Engineering
University of Belgrade

References
[1]Public Transportation – Accessibility for All. For more information visit www.pubtrans4all.eu/en/index.php or contact Benjamin Petutschnig benjamin.petutschnig@tuwien.ac.at / Prof. Dr. Goran Simic gsimic@beotel.net
[2]a full-owned subsidariy of DB Regio
Rüger B, Tauschitz P, Petutschnig B., Boarding Assistance System Evaluation Criteria Report, deliverable 2.1, June 2010. EU-FP7-Project Public Transportation – Accessibility for all
Rüger B, Tauschitz P, Petutschnig B., Existing Boarding Assistance System Evaluation Matrix Report, deliverable 2.2, August 2010. EU-FP7-Project Public Transportation – Accessibility