

# EURAIL *mag*

**BUSINESS & TECHNOLOGY**

THE MAGAZINE FOR EUROPEAN RAIL DECISION MAKERS



**FLEET MAINTENANCE  
& COMMUTER RAIL**

**MATERIALS –  
INSIDE & OUT**

**VIDEO SURVEILLANCE –  
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**THE 'CONNECTED' TRAIN  
GROWS ACROSS EUROPE**

**BUILDING CORE REDUNDANCY  
TO INCREASE RELIABILITY**



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BUSINESS & TECHNOLOGY



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EDITO

## Comparative in form & function

This year in rail began with the 4<sup>th</sup> Railway Package pending in Brussels. A comprehensive selection of measures, it promises to significantly impact Europe's railways, hopefully for the better, in the coming years. The overarching aim being to address those issues considered to be hindering the further development and competitiveness of the sector by focusing on four key areas: standards and approvals that work; better quality and more choice by allowing new players to run rail services; a structure that delivers; and a skilled workforce.

In parallel to this decision-making process, the industry continues making progress in various domains – construction techniques, innovation in design and technology, and service enhancements. In terms of time and money, it simply cannot afford to stand still; on the contrary, given the critical importance of rail to the European economy, coupled with the penury of euros in most public coffers. Currently more than eight billion passenger journeys are made by train each year, and rail carries about 10% of all freight traffic across Europe.

Yet there is no doubt that Europe faces major transport challenges. Traffic demand is rising, with freight transport projected to increase by around 40% in 2030 (compared to 2005), and by little over 80% by 2050. Meanwhile passenger traffic is expected to grow 34% by 2030 and 51% by 2050. And who can ignore the linked challenges posed by traffic congestion, fuel security and prices, and CO<sub>2</sub> emissions?

Little wonder that the pressure remains on rolling stock manufacturers, infrastructure managers, and service providers to make networks run lighter, faster, and more efficiently, to offer greater capacity and comfort, and to perform more competitively... than... last year; than a decade ago; than two decades ago. Europe's railways are now defined by the comparative. Good enough must necessarily become better if the plan for a European future for rail is to really take form and function ■

# Summary



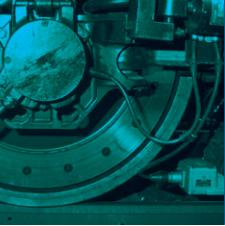
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# BASICS FOR EFFICIENT & CUSTOMER-FRIENDLY LUGGAGE LOCKING



Passengers killing time while waiting for departure

LOCKING UP LUGGAGE AT A RAILWAY STATION IS A BASIC SERVICE MANY PASSENGERS WANT TO USE. LUGGAGE IS OFTEN A DISTURBANCE, ESPECIALLY WHEN PASSENGERS TRY TO USE THEIR TIME EFFICIENTLY, LIKE FOR SHOPPING, FOR MEETINGS, OR FOR SIGHTSEEING. MOST OF TODAY'S LUGGAGE LOCKERS DO NOT FULFIL THE NEEDS OF MODERN TRAVELLERS. THIS PAPER GIVES AN OVERVIEW OF ALL THE NEEDS AND EXPECTATIONS OF PASSENGERS WITH REGARDS TO LUGGAGE STORAGE AT THE STATION. IT ALSO HIGHLIGHTS THE BENEFITS FOR STATION OPERATORS WHO OFFER SUITABLE AND ACCEPTED STORAGE SYSTEMS.

Long distance travellers by train usually carry a lot of luggage. Depending on the travel purpose, the configuration of luggage items will vary, but on average every passenger has got one piece of hand luggage and every other passenger an additional second piece of luggage.

There are many reasons why offering the possibility of locking up luggage at the station is meaningful and required. Business travellers, for example, may lock up luggage during meetings, or tourists may want to use their waiting time for sightseeing. But one reason which is interesting for both

railway station operators and passengers alike is the waiting time at the station until the train leaves.

Aircraft passengers are used to duty-free and shopping areas in order to pass their time until departure. Modern railway stations are also turning more and more into shopping malls, offering train passengers the possibility of “using” the time before departure by shopping, eating and drinking, etc. The big difference between the offered services at airports and at train stations is that aircraft passengers already have checked in their luggage and are therefore able to go on a shopping tour without being handicapped by their belongings. Train passengers, however, always have to carry all of their luggage with them, which leads to the fact that passengers, especially those who arrive at the station early or who have to wait for a connecting train, can hardly use all the attractions in the station. Luggage is a big handicap because it’s hardly possible to saunter with it through the narrow aisles of full shops. Passengers who have no arm left will wait outside of the shops and watch their belongings. Figure 1 shows an example of countless passengers sitting around and waiting for departure. If passengers had no luggage they could spend their time shopping. This would lead to two advantages: (1) The waiting time is experienced as much

shorter when strolling through shops instead of sitting on a bench in a cold departure hall. This will make the railway more attractive. (2) People browsing through shops will increase the shops’ turnover.

The above examples show that a customer-friendly possibility of storing luggage, even for a short time, is necessary and meaningful for passenger comfort, for the railway undertakings, and for the station operators. However, the storage possibilities offered at train stations today do not fulfil the requirements of modern travellers in any way. Therefore a study funded by the Austrian Research Promotion Agency (FFG) and the Austrian Federal Ministry of Transport, Innovation and Technology (BMVIT) analyses the basic needs of passengers with regards to luggage storage and will design a concept for a new customer-friendly locker system. This paper focuses on the passengers’ needs and expectations.

## PASSENGER NEEDS AND EXPECTATIONS

### Use of waiting time

Depending on the age and the sex of passengers, the use of the waiting time differs. For example, younger men more often prefer to use the time for working than women or the elderly. But in general every fourth passenger will to go

If you had to wait today for 30 minutes or longer at the station, which activities would you choose?

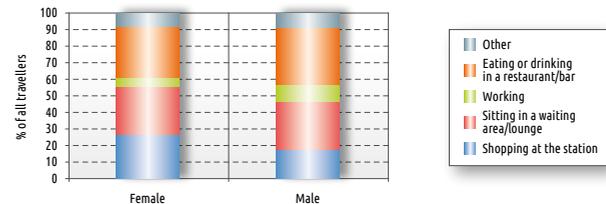


Fig. 1. Activities if the waiting time is longer than 30 minutes

shopping or strolling through the shops. About one third prefers to sit in a bistro or restaurant to eat something. An additional third prefers sitting in a waiting area or in a lounge (see Fig. 1).

In general, more than one third of the passengers who want to stroll around or go to a bistro say that they feel “handicapped” or “very handicapped” by their luggage. But also every fourth passenger who wants to sit in a waiting area or who wants to work feels handicapped because of the luggage (see Fig. 2).

These numbers are an average of all passengers depending on the planned use of time. The perceived difficulties in-

crease with the number, size, and weight of luggage items. About 60% of passengers with large and heavy luggage items feel handicapped by the luggage when they want to use the time for shopping or going to a bistro or restaurant. And even 30% of passengers with medium sized luggage do.

These figures illustrate the large number of potential consumers who want to go shopping or eat and drink but can’t do that in most cases. This also points out the need and the significance of short term luggage lockers. But the offered service must be as close to the customer’s needs and expectations as possible. What passengers expect under different circumstances will be pointed out below.

Would you feel impaired because of your luggage when carrying out planned activities?

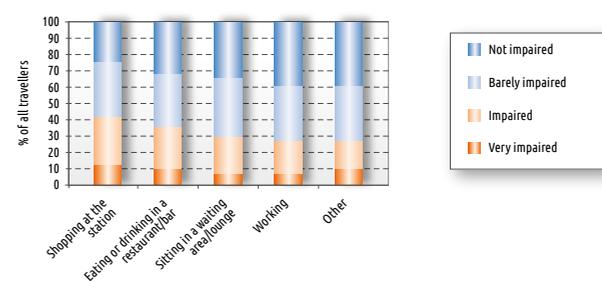


Fig. 2. Felt impaired because of luggage while doing different activities

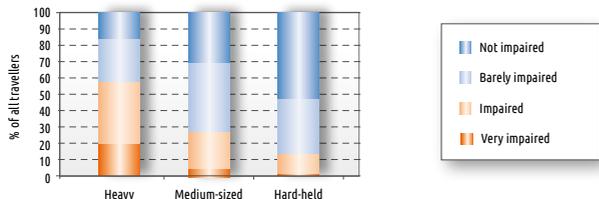


Fig. 3. Felt impaired because of luggage

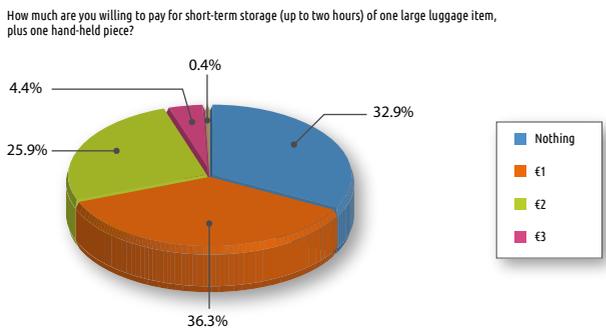


Fig. 4. Willingness to pay for short-term storage

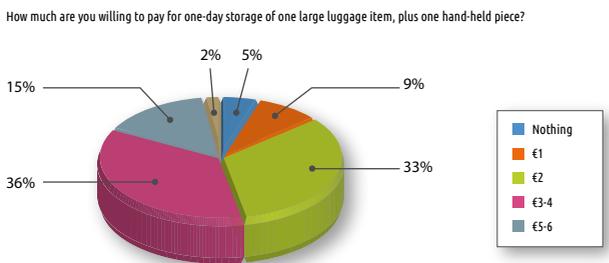


Fig. 5. Willingness to pay for one-day storage

**Main problems with usual lockers**

Two main problems regarding today's lockers emerge. In general, the handling of luggage is often very inconvenient and, especially for short term storage, the prices are relevant parameters of acceptance. There is no system known at railway stations that offers short-term storage for free or for a very low price.

**Price**

To make short-term luggage storage attractive for travellers, the price is one of the most important criteria. About 70% of all passengers name the price as an essential reason why they don't use a locker. The willingness to pay depends on the duration of storage. About one third of passengers who would like to use a locker for short-term storage for a more pleasant use of their time at

the station does not want to pay for that service; more than one third is willing to pay one euro for one luggage item and hand luggage. Only one quarter is willing to pay more than one euro (see Fig. 4).

These research results show that if station operators want to have as many shopping passengers as possible, short-term storage (up to two hours) should be offered for free. The maximum acceptable amount is one euro. But it must not be forgotten that the deciding factor whether people will actually use the service or not will boil down to that one euro they would have to pay. So even if two thirds of the asked passengers say they are willing to pay one euro, many won't do so in reality.

It seems best to offer short-term storage for free while taking into account that the lockers will pay off indirectly: since the number of passengers who will use the retail possibilities will greatly increase, the turnover and the profit will rise.

Passengers are willing to pay more for a storage duration of one day. Only 15% are willing to pay only one euro; one third is willing to pay two euros; and an additional third is willing to pay three or four euros. Since the station operator has no immediate benefits, like additional shopping passengers, a price between two and four euros seems to be acceptable (see Fig. 5). But, of course, passengers who lock up their luggage for several hours or a whole

day will also come back before departure and might leave the luggage in the locker for doing some shopping at the station before their train departs.

**Handling**

Apart from the price, the handling of luggage lockers is an essential criterion for acceptance. The handling process consists of easy locating, the potential necessity of lifting up the luggage, the size of the lockers, the immediate handling (payment process, central touch screen, etc.), the time duration of the locking process, and the return of the luggage.

The most important factors are the size of the lockers and the fact of whether the luggage must be lifted or not. For short-term storage, the time needed for the storage process is also essential, especially when passengers want to pick up their luggage in order to go to the train.

**Required lifting of luggage**

Depending on their age and sex, travellers experience difficulties when lifting their luggage. For example, about 50% of all female passengers with large luggage are not able or willing to lift it, while about 20% are able or willing to lift it up to about one metre, and only 30% are able to lift it higher. For about 70% of all female and 40% of all male travellers, storing luggage at floor level is important or very important. Also, for 70% of all passengers above the age of 60 this is a must.



Many passengers have troubles when lifting their luggage

### Time needed

The time needed for storing and especially for retrieving the luggage is another very important criterion for acceptance. More than 25% of the surveyed train passengers say that luggage retrieval must not take longer than one minute. More than 50% would accept a retrieval time between one and three minutes (see Fig. 6). This time

frame includes the whole process from arriving at the locker site to retrieving the luggage and leaving. Passengers indicated that the perceived time needed – when they are in a hurry and nervous because of the approaching departure of their train – is especially important. If passengers are in a hurry, one minute can be perceived as five minutes. For

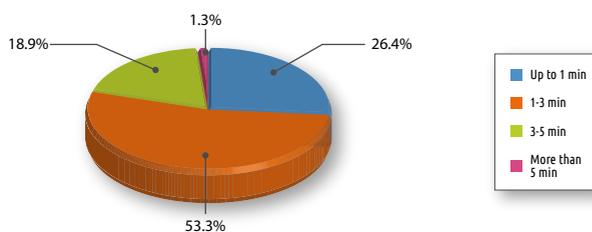


Fig. 6. Maximum allowed time need for luggage return

Would you like to store luggage for a short time in order to make easier use of the station facilities?

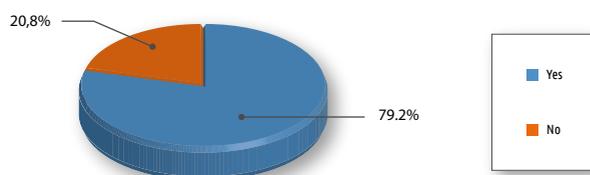


Fig. 7. General wish of luggage lockers

systems that may need a little bit longer – for example, central locker terminals – a timer that tells the remaining time in seconds would be very meaningful.

### Space needs

Many of today's lockers are too small for usual luggage items. The width of many lockers is 33cm, but 40% of all luggage items are bigger than this size. That means 40% of luggage items do not fit into normal lockers. Passengers either cannot store them or are forced to use a much more expensive locker for large items.

### SUMMARY & CONCLUSIONS

About 80% of passengers staying more than 30 minutes at the station would consider using a short-term locker in order to move around more easily when using the station's infrastructure like shops or bistros. For half of them, the handling must be very quick. One third says they will use storage possibilities only if no fee is charged. Station operators are likely to benefit if they offer short-term luggage storage for free, since the number of potential retail customers at the station would greatly increase.

With regards to the acceptance of the system and to passenger comfort, needs, and expectations, a locker system is required that allows floor-level storage or storage at a very low height. The system must also serve the different dimensions of today's luggage!



Central luggage terminal in Cologne

Therefore many travellers would prefer central locking terminals like in Cologne's main station (see photo above). But in this case the handling time is very important.

In order to fulfil all the different customer needs, an Austrian project consortium consisting of the partners Upper Austria University of Applied Sciences, the St.Pölten University of Applied Sciences, and the consultant network GesmbH is working on a completely new storage system that allows customer-friendly storage while being very efficient for station operators at the same time[1]

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Hans-Christian Graf & Burkhard Stadlmann, Upper Austria University of Applied Sciences

References  
[1]Rüger B, Zwischenbericht Store&Go (November 2010), ways2go-project funded by FFG