



BOStrab in Germany

Regulation on the Construction and Operation of Urban Rail Systems

dated 11th December 1987



Curriculum vitae Heino Schultze

■ Education:

1975 – 1984 Studies of civil engineering

1992 Certification to Operations
Manager according BOStrab Standard

■ Employment Record:

- **1985 – 1995** Dortmunder Stadtwerke
Public Transport Operator in the City of Dortmund
- **1997 – 2002** Stadtwerke Krefeld
Public Transport Operator in the City of Krefeld
- **2002 – 2008** Verkehrsbetrieb Schäpers
Private Transport Operator for bus services



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*Specific:
of Streetcars*



BO Strab in Germany

- Law to build and to operate streetcars
 - **build means:**
to build the way and the vehicles

 - **operate means:**
manage the passenger transfer and drive the vehicles



German Law

- Law on Passenger Transportation in Germany
 - Central Law on Passenger Transportation
 - In this law the Federal Republic of Germany bundles all the laws / regulations to operate Public transport in Germany



Regulation of Public Transport in Germany

- **BO Kraft**
(how to operate public transport with buses and trolleybuses)
- **General conditions for passenger transportation**
(how to handle everything with the passengers, like „found and lost“)
- **Fares**
- **BO Strab**



BO Strab – Overview -

- General
- Management of operation
- Drivers and technical staff
- Infrastructure
- Vehicles
- Operation
- Authority



General

Streetcars (tram)

Shared right-of-way: can use streets / shared with all the other traffic

Streetcars (light rail)

Exclusive or separated right-of-way / no other traffic
(Metro, Underground, also: operation without drivers but not : heavy rail)



Management of operation (1)

- Company has to comply with the requirements
- Infrastructure and vehicles have to be in safe state
- Operation must be safe
- Company has to name an operation manager



Manager of Operation (1)

- Is responsible for the safe and orderly operation
- has to „explain“ regulation / operation instructions for the drivers and any other technical workers in the company
- Is responsible that everybody will comply with these regulations and instructions
- Has to immediately contact the authority if an accident has happened (human casualties)



Manager of Operation (2)

- **Conditions:**
 - No criminal record
(driving drunk or driving too fast or driving on red light)
 - Training programm to learn about the standard BOStrab and its use in day-to-day operation
 - written and oral examination
 - **Certifcation to Operations Manager**



Drivers and Technical Staff

- You have to be 21, not younger, to drive a streetcar
- Drivers have to undergo special medical examinations
- Driver qualification trainings are performed regularly and supervised by the company
- The company have to document every training course



Infrastructure – Track Way (1)

- Trackway should be separated from the other traffic
(Operators can apply for subsidies from the Government to build separated ways)

...are in the streets , but really separated by street structures like curbstones, hedges or other obstacles



Infrastructure – Trackway (2)

- Tracks should be separated from the other traffic
- Trackway for bi-directional operation should have more than one track
- Tracks of streetcars are not allowed to cross heavy-rail-tracks on the same level



Infrastructure – Trackway (3)

- Trackwork
- Clearance gauge
- Safety spaces
- Crossings
- Signalling equipment
- Train Protection equipment
- Communication equipment



Infrastructure – Trackway (4)

- Power Supply
- Bridges
- Tunnels
- Stations
(next pages) for every operation



Infrastructure – Streckenanlagen (5)

■ Stations -1-

special operations need special infrastructure like

- Passenger information / Passenger transfer
- Supervision of passengers boarding or alighting the trains
- emergency calls (to the OCC)
- Fire extinguishers
- First Aid



Infrastructure – Streckenanlagen (6)

■ Haltestellen/ Stations -2-

dimensions of the stations important:

- gauge between the vehicle and the station platform should be very little – **no more than 25cm**
- the station platform should not be higher than the vehicle floor



Streetcars (Light-Rail-Vehicles)(1)

Design of the vehicles

- Fire protection: fire-resistant materials for any parts
- Floors
- Articulated joints
- Emergency exits in sufficient number
- Design and Construction
(Streetcars >< Underground)



Streetcars (Light-Rail-Vehicles)(2)

Vehicles - dimensions

- Streetcars : no more than 2,65 m
most often : 2,40, new models higher
- Underground: may be higher
(Berlin: 2,30m and 2,65m)
(Munich: 2,90m)



Streetcars (Light-Rail-Vehicles)(3)

Vehicles – Brakes

- Streetcars must have no less than two brakes
- Independent from each other
- One brake shall be sufficient for the vehicle to remain stopped on the greatest gradient in the network



Streetcars (Light-Rail-Vehicles)(4)

Vehicles – Brakes

- In ... vehicles... a passenger must be able to activate the brake
- On tracks without safety spaces (bridges, tunnel) such passenger action may not stop the vehicle immediately – the vehicle will be moved to the next station (signed at drivers cabin)



Streetcars (Light-Rail-Vehicles)(5)

- Information on vehicle front
 - Line number
 - Final destination
 -
- (only streetcars)
- on side of the vehicle
 - Line number
 - Final destination
 - Follwing stations
- **Information inside the vehicle:**
- Announcement of the next station
- **Communication between the passengers and the driver and OCC**



Operation(1)

Driving a streetcar

- by the driver himself –
he has to decide to stop
- Max. speed driving on “view” = 70 km/h
if you go higher,
you will need automatic train control
- Max. length of streetcars = 75 m
if you need longer trains,
streetcars has to operate on separated ways



Operation (2)

Maximum speed:

streetcars $v = 70 \text{ km/h}$

metro depending on network, vehicles

Max speed is setting by the authority
(dependent on vehicles, network, ...)

In streets: the maximum speed of all traffic
(for example: pedestrian areas)

Passing platforms:

max $v = 40 \text{ km/h}$

Running over the facing point

max $v = 15 \text{ km/h}$ (not locked)



Operation (3) – automatic Operation

(... Attending the vehicles with drivers
is not necessary, if ...)

Regular technical inspection

Clearance has to be proved

Connection between passengers and Operation center

Rescue of the passenger would be possible immediately



Inspecting Authority

- You need a “planning approval notice” to build the infrastructure to build the vehicles
- After the notice is given you have three years to start
- The authority supervised the operation manager
- The operation manager is officially nominated



Summary

- The operation manager has to decide

mostly the company wants to earn money

the authority wants operation and infrastructure safe

operation manager wants to feel confident and safe

- All the instructions for the workers have to be in a rule book
- Operator / all the staff have to use these rules

always: Operation has to be safe