
HSL
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Helsinki Region Transport

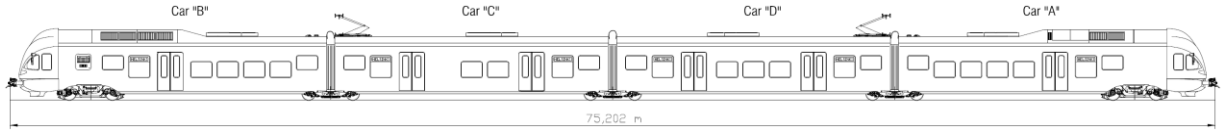
The Rolling Stock / Maintenance / Maintenance facilities

5.2.2018

The Rolling Stock

- The rolling stock is procured and managed by the Rolling Stock Company Pääkaupunkiseudun Junakalusto Oy (JkOy)
  - JKOY in wholly owned in the public sector by HSL municipalities
- Supplier of the rolling stock is Stadler Bussnang AG
- The brand name given by Stadler to the EMUs is Flirt; Fast Light Innovative Regional Train
- Complete fleet is 81 Sm5-train units delivered between 2009 and 2017:
  - Train units 1 – 32 delivered between 2009 – 2014
  - Train units 33 – 41 delivered during 2014
  - Train units 42 – 81 delivered between 2016 - 2017

EMU FLIRT – Technical features



Technology
- Automatic coupler
- Welded car body structure with extruded aluminum profiles
- Air-suspended bogies
- Multiple-traction up to three trains

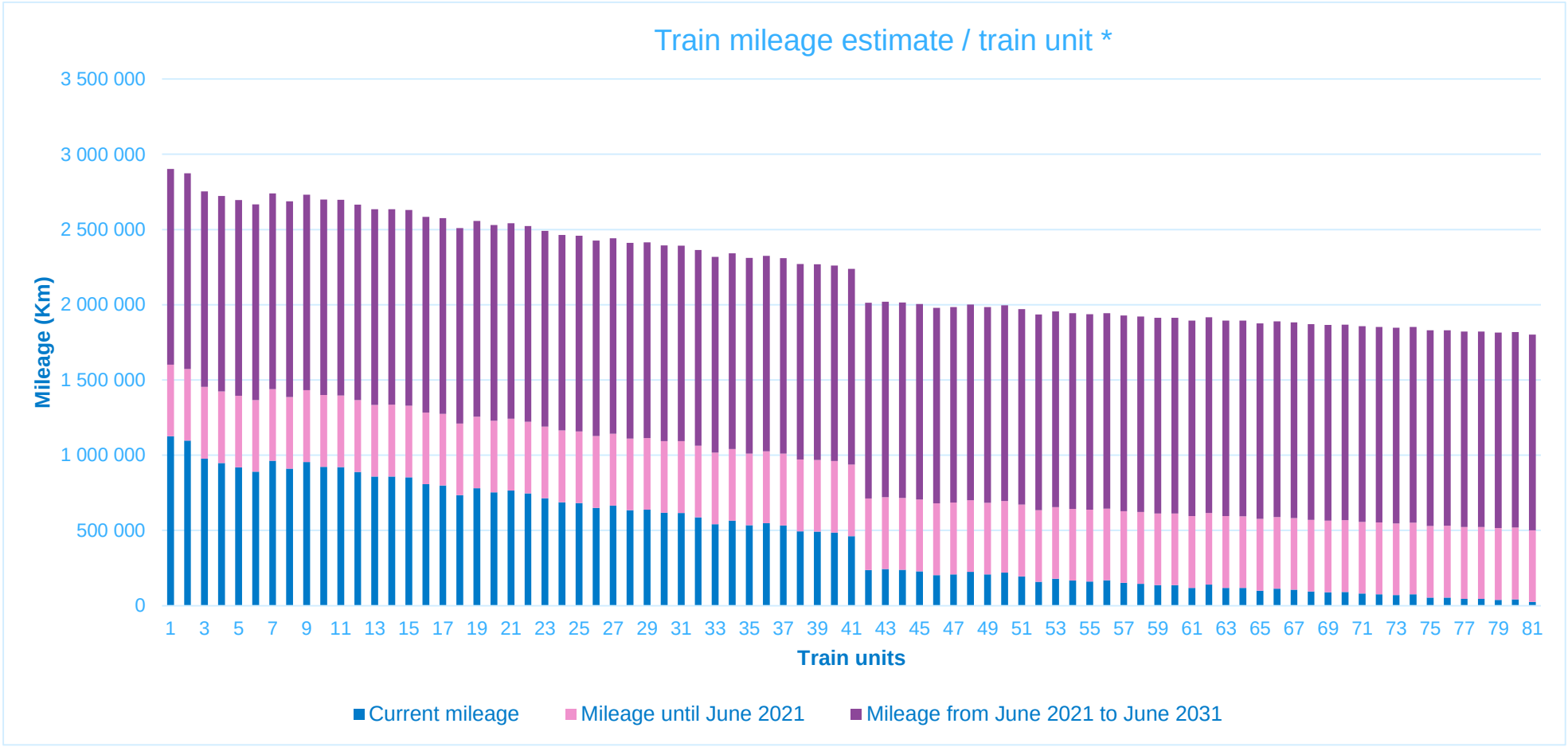
Comfort
- Bright, passenger-friendly interior with customized design
- Excellent visibility through the whole passenger area
- Low-floor section > 70 %
- Passenger information system
- Spacious multipurpose area in entrance section
- 6 doors on each side for fast entry and exit of passengers
- Door to the multipurpose area that complies with the TSI PRM is equipped with a moveable step that covers the gap between the doorstep and platform
- Air-conditioned passenger and driver compartments
- Vacuum toilet system, also suitable for people with reduce Mobility

Personnel
- Ergonomically designed driver‘s desk
- Glass fiber reinforced plastic front cabin

Reliability / Availability / Maintainability / Safety
- Redundant traction chain with 4 water-cooled IGBT power converters
- Vehicle control system with train bus, vehicle bus and diagnostic computer
- Video surveillance

GAUGE	1524 mm
DESIGNATION	Sm5
CATENARY VOLTAGE	25 kV, 50 Hz
AXLE ARRANGEMENT	Bo'2'2'2'Bo'
NUMBER OF TRAINS	1st series: 32 2nd series: 9 3rd series: 40 Total: 81
SERVICE START-UP	2009
TOTAL SEATING CAPACITY (1 – 41 / 42 – 81)	260 / 238
FOLD-UP SEATS (1 – 41 / 42 – 81)	28 / 34
STANDING CAPACITY (4 PERS./M²) (1 – 41 / 42 – 81)	323 / 340 (accord. to DIN 25008)
FLOOR HEIGHT **LOW FLOOR** **HIGH FLOOR**	 600 mm 1120 mm
DOOR WIDTH	1300 mm
LONGITUDINAL STRENGTH	1500 kN
OVERALL LENGTH	75200 mm
VEHICLE WIDTH	3200 mm
VEHICLE HEIGHT	4400 mm
BOGIE WHEELBASE **MOTOR BOGIE** **TRAILER BOGIE**	 2700 mm 2750 mm
POWERED WHEEL DIAMETER (NEW)	870 mm
TRAILER WHEEL DIAMETER (NEW)	800 mm
CONTINUOUS POWER AT WHEEL	2000 kW
MAXIMUM POWER AT WHEEL	2600 kW
STARTING TRACTIVE EFFORT (UP TO 47 KM/H)	200 kN
MAX. ACCELERATION (FULL LOAD)	1.2 m/s²
SERVICE SPEED	160 km/h

Current status and future estimate of the fleet mileages



*Estimates are based on 130 000 km / year and they are subject to change depending on the future timetable development.

Current maintenance programme

- → Maintenance is performed based on the maintenance programme defined by the train manufacturer.
- → All units follow the same maintenance programme
- → Maintenance intervals are based on mileage and time
- → Starting point for the maintenance programme has been yearly mileage of 150 000 km
- → Maintenance intervals are split into preventive work (P) and revisions (R):

Maintenance period	P1	P2	P3	P4	R0	R1	R2	R3
Interval in months	1	3	6	12	12	72	144	216
Interval in Km	12 500	37 500	75 000	150 000	150 000	900 000	1 800 000	2 700 000

- → A tolerance of +/-10% applies to all interval specifications (kilometers, units of time).
- → Maintenance programme includes also some single tasks between the maintenance periods, for example ultrasonic testing of axles after 500 000 km or 90 months

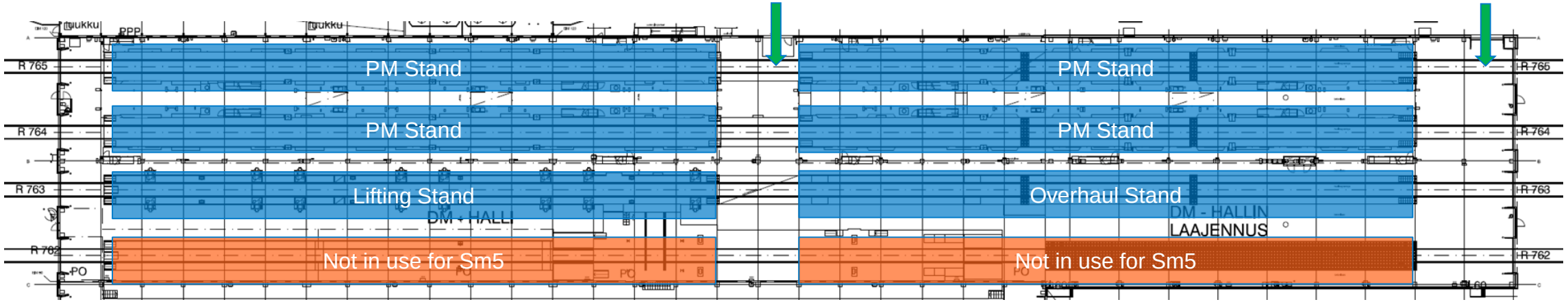
Current maintenance reponsibilities

→ Current maintenance tasks can be split into 3 different categories based on the responsibility:

Category	Cat 1.	Cat 2.	Cat 3.
Responsible of the execution	Operator	Operator	Rosco
Financial responsibility	Operator	Rosco	Rosco

- 1: Normal preventive maintenance
- 2: Heavier maintenance with longer intervals. Price is fixed in the operation contract. Normally for tasks that must be done on the train. For example the exchange of pivoting bearing between cars, which is done after 1 000 000 km or 2160 days.
- 3: Heavy maintenance. Normally for high cost components that can be removed from the train and sent out to 3rd party for overhaul, for example bogies. Rosco has exchange components available. Removing and mounting the components are mainly in Cat 2.

Current maintenance facilities - depot



- PM stand, Fully equipped for preventive maintenance tasks:
  - Roof access
  - Pit
  - Power, water, compressed air
- Lifting stand:
  - Lifting jacks to lift the train for example for bogie exchanges
- Overhaul stand:
  - No roof access, overhead crane 12,5t
  - Pit
- Not in use for Sm5:
  - Stand currently occupied with different fleet
  - Stand will be modified to be used in the maintenance of Sm5-fleet