

DEVELOPING PROFESSIONALS PRESENTATION COMPETITION REF SCOTLAND

Class 365 Introduction for ScotRail

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ABSTRACT

This paper outlines the process taken and challenges faced in the introduction of the Class 365 to Scottish routes.

Particular attention is given to the feasibility study to identify the Class 365, the actions carried out to introduce the fleet ahead of schedule, and the maintenance planning implemented to keep the fleet in service through periods of high demand.

INTRODUCTION & PROBLEM STATEMENT

In early 2018, Abellio ScotRail plotted out their rolling stock changes throughout the year: 4 Class 170 diesel multiple units (DMUs) to leave the business in February, and 6 Class 170 DMUs to leave in August. Brand new Class

385 electric multiple units (EMUs) from Hitachi were due to arrive in Scotland in May, but problems with windscreens delayed this until December at best, leaving 5 months without adequate rolling stock.

SNC-Lavalin were asked to help support ScotRail in finding a new fleet, with the requirement of introducing it for passenger service in mid-July.

ALTERNATIVE FLEET FEASIBILITY STUDY

Early investigations found two options for alternative fleets; Class 315 and Class 365 EMUs, for which two main criteria were considered: the suitability of the train for the passenger, and the timescale by which the fleet could be introduced. The timescale was influenced by various factors: driver

training, network compatibility, modification requirements, cost, operations and depot requirements. For all of these criteria, Class 315 came out on top, but the way it would be deployed in Scotland would mean a capacity reduction for passengers. This forced the team to work through the issues with the Class 365.

INTRODUCING THE FLEET

FLEET COMPATIBILITY

The wide, low profile of the Class 365 posed a large issue for compatibility with infrastructure, with initial studies showing that 80% of platforms would be fouled by the Class 365. However, by raising the body height of the vehicle and trimming the passenger footstep, the number of fouls was drastically reduced. Clearing the remaining fouls and reduced clearances became an exercise in route

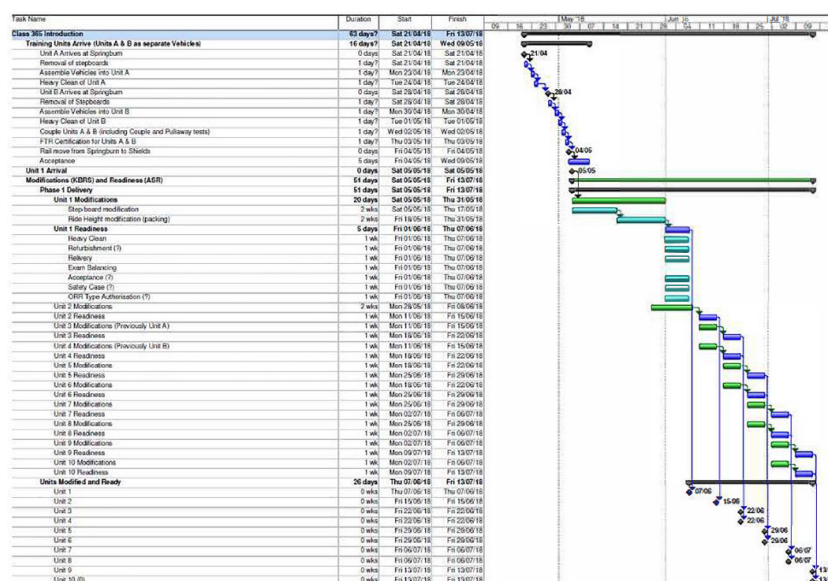


Figure 1: Vehicle delivery and modifications - early plan

management and carefully mitigating the risk of fouls. The required routes were produced, and the remaining gauging issues were carefully considered for all possible approaches to mitigate them.

FLEET DELIVERY AND MODIFICATIONS

One of the biggest challenges of the project was the delivery and modification of the fleet. Over the course of less than three months, ten trains had to go through a modification procedure, with two trains needed very quickly for driver training. The modification plan had very little slack in it, and was managed carefully to ensure important deliveries and other milestones were not missed. The project plan for this phase is shown in **Figure 1**.

HOW TWITTER CHANGED THE PROJECT

As units arrived in Scotland for modification and driver training, the course of the project drastically changed for several weeks. The main cause of this were photos that had appeared on Twitter showing dirty roofs and information displays not showing Scottish information. From this point on, updating information displays and cleaning/painting roofs as part of the modification program became a key focus. Furthermore, news of the unmodified fleet arrival put pressure on the project team to deliver. Public expectation of a near improvement to capacity led the fleet introduction to be moved forward by three weeks.

SAFETY VALIDATION

Ensuring the fleet was safe to operate was another challenging task. A hazard identification session was carried out, with

representatives from all ScotRail departments and Network Rail present to ensure all hazards were identified. Hazards were filtered into stages: Driver Training and Passenger Service, with each having only a few weeks to closeout hazards. An approach of assigning owners within ScotRail to each hazard was used, with one person assigned to tracking, storing and compiling evidence. Safety validation was signed off by necessary parties prior to both training and passenger service, with evidence ranging from Network Compatibility documentation to comparisons showing the reduced footstep width would still be safe.

FLEET READINESS

In the run up to passenger service, focus was taken off the modification program as it became clear that vehicles would be delivered on time and was shifted to ensuring that the fleet was ready for passengers. A large coordinated effort to carry out various readiness activities was put in place, with a matrix used to track all actions. These actions ranged from customer experience actions like safety and marketing posters to removing seats to allow catering trolleys to pass through corridors. An excerpt is shown in **Figure 2**.

MAINTENANCE PLANNING

Following the early introduction of the fleet, maintenance planning became a key focus, due to the Class 365 maintenance cycle being vastly different to other ScotRail fleets. A combination of factors led to planning being a difficult task, notably:

- The stabling location and maintenance location were not the same
- Moves between depots could only take place at night and on weekdays, meaning that a unit moved for maintenance on Friday wouldn't return to service until Tuesday
- Only two units could be moved between depots at a time
- Examination times ranged from half a shift to a full week
- Units had to be kept available for passenger service and for driver training

A day-by-day maintenance plan was created to show the daily locations of each unit and to plan maintenance moves around demanding periods of passenger service through local events. Planning maintenance this way kept the fleet in service, whilst carrying out a mixture of examinations every night throughout the week. An excerpt of the plan is shown in **Figure 3**.

CONCLUSION

The outcome of this project was a drastic service improvement to the Edinburgh-Glasgow ScotRail route, with 17,000 seats delivered daily by the Class 365 fleet. The introduction on time mitigated what would have been a significant service failure and allowed Edinburgh-Glasgow to become a fully electric operated service. Throughout the project, it was seen that collaborative working was the key to delivering trains to passengers.

[illegible]

Figure 2: Class 365 readiness matrix

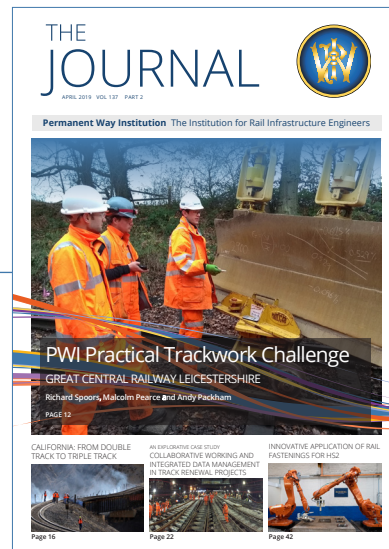
Day Date	We 26th	Thu 27th	Fri 28th	Sat 29th	Sun 30th	Mon 1st	Tue 2nd	Wed 3rd	Thu 4th
	523	523	523	523	513	523	523		523
	513	513	513	513	513	513		513	513
	517	517	517	517	517	517	517		517
	525	525			537	537	525	525	525
Available units for Service	507	507	537	537	537	507	507	507	507
	521	521	521	521	521	521	521	521	
	519		519	519		519	519	519	519
	533		533	533	533	533	533	533	
Service Units Available	8	7	8	8	8	8	8	7	8
Service Units Required	0	0	8	8	8	0	8	8	0
Gap	0	Even	1 SHH even	0	Even	0	Even	0	Even
Shut down at Mittelschill				523					
				519					
						to SHd 513	to SHd 523	to Ehd 523	
						to Ehd 513	to SHd 517	to Ehd 517	
Move			to SHd 525			to Ehd 525			to SHd 537
	to Ehd 509								to Ehd 531
	to SHd 519	to Ehd 519							
	to SHd 533	to Ehd 533							
						X 513	X 523		
						X 517	X 517		
Out of Use (Fault/Excess)									
**exam has already been deferred by 7.5k									
**exam has already been deferred by 1k									
	509								
	X 519								
	X 533								
Units for Driver Training	not required	not required	not required	not required	not required	525	513	not required	not required

Figure 3: Class 365 maintenance planning sheet

TECHNICAL ARTICLE

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