

Network Access

Possession Compensation and Network Availability on Britain's Railways

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Overview

- Background
- Possession compensation system in Britain
- Compensation formulae and calculations
 - Automating the calculations
- Increasing Network Availability
 - Industry Access Programme
 - Alternative approaches
- Summary and Conclusions

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Background

- Access pressures
 - Increasing levels of passenger and freight traffic
 - Increased ‘wear and tear’, need for M&R
 - Pressure to reduce durations of M&R possessions
- Possession compensation payments a significant element of RU revenue
 - Desire to check IM calculations and payments
 - Forecast likely future payments

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Possessions Compensation System in GB

- Set out in Schedule 4 of Track Access Contracts, hence Schedule 4 Compensation System (S4CS)
- Components (for passenger TOCs):
 - Effects of possessions on fare revenue
 - Cancelled Stops
 - Extended Journey Times
 - Changes in train mileage (us. –ive)
 - Also, replacement bus service costs

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S4CS Compensation Formulae

- $NRP = \sum((WACM + NREJT) * BF * NRPR * NF)$
- $WACM = (CM - NRPP) * \sum(MPW * CS / SS)$
- $NREJT = EJT * (1 - \sum(MPW * CS / SS))$
- $EJT = \min(SG \text{ Cap}, AJT * (u - v) / v)$.
- $BF = \sum(MPW * SS / AS)$

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S4CS Compensation Calculations (1)

- Compare two timetables:
 - Corresponding (T1, normal TT)
 - Applicable (T2, possession-affected TT)
- For each, calculate:
 - Stop count by MP for each SG
 - Average speed for each SG
 - Mileage for each SG
- Combine with AJTs, MPWs, BFs, NFs, etc.

S4CS Compensation Calculations (2)

- Quite data-intensive and time-consuming
- Potentially error-prone
 - Initial commission to audit a set of results
 - Follow-up commission to develop a calculation tool
- Initial development in Perl
- Subsequent implementation in Excel
 - Ubiquitous
 - Familiar, user-friendly interface

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Timetable Differences

Calculated Service Alterations Worksheet.xlsx - Microsoft Excel

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1 **Changes Between Corresponding and Applicable Timetables**

SG	MP	Direction	T1 Stops	T2 Stops	SG	T1 Train Count	T2 Train Count	Notification Factor:	TT Year Ending:
SG01	MP1	Forward	21	27	SG01	57	71	0.45	2015
SG01	MP2	Forward	28	38	SG02	33	42		
SG01	MP3	Forward	28	37	SG03	5	5		
SG01	MP4	Forward	27	36					
SG01	MP5	Forward	27	35	SG	T1 Total Journey Time (hh:mm:ss)	T2 Total Journey Time (hh:mm:ss)		
SG01	MP6	Forward	27	35	SG01	230:42:00	276:55:30		
SG01	MP5	Reverse	25	26	SG02	77:38:00	100:53:00		
SG01	MP3	Reverse	27	29	SG03	13:34:00	13:34:00		
SG01	MP2	Reverse	28	31					
SG01	MP1	Reverse	21	23	SG	T1 Total Mileage	T2 Total Mileage		
SG01	MP7	Reverse	1	1	SG01	19500.74297	23049.52813		
SG02	MP8	Forward	16	20	SG02	6133.875	7806.75		
SG02	MP5	Forward	16	20	SG03	962.1249634	962.1249634		
SG02	MP6	Forward	16	20					
SG02	MP5	Reverse	17	22					
SG02	MP9	Reverse	17	22					
SG02	MP10	Reverse	17	22					
SG03	MP4	Forward	1	1					
SG03	MP6	Forward	1	1					
SG03	MP5	Reverse	4	4					
SG03	MP4	Reverse	3	3					
SG03	MP11	Reverse	1	1					
SG03	MP10	Reverse	2	2					
SG03	MP8	Reverse	2	2					
SG03	MP12	Reverse	0	0					
SG03	MP13	Reverse	1	1					

Calculated Service Alterations Results Sheet3

Ready 100%

Final Results

Calculated Service Alterations Worksheet.xlsx - Microsoft Excel

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	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	Results															
2																
3		SG	WACM	NREJT	BF	MRE	RPI Factor	NF	WACM RP	NREJT RP	Total RP		MP		Totals	
4		SG01	21.06849	0	1.547192	xxxx	1.114	0.45	xxxx	£0.00	xxxx		xxxx		xxxx	
5		SG02	72.36298	5.356036	1.351433	xxxx	1.114	0.45	xxxx	xxxx	xxxx		xxxx		xxxx	
6		SG03	228.7122	0	1.355376	xxxx	1.114	0.45	xxxx	£0.00	xxxx		xxxx		xxxx	
7																
8								Totals	xxxx	xxxx	xxxx		xxxx		xxxx	
9																
10																

Calculated Service Alterations Results

Ready 100%

Implementation of Tool

- Initial Use and Feedback
 - List of TT changes rather than Applicable TT
 - De-bugging of process
 - Hampered by lack of access to underlying parameters and inputs for direct comparison with IM calculations
- Next Steps
 - Possible further refinements and fine-tuning
 - Increased use among TOCs

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Increasing Network Availability

- Seven-Day Railway
 - Measures of Network Availability
 - PDI-P and PDI-F et al.
 - Measured retrospectively against CP targets
 - A more pro-active approach needed
 - Possession planning optimisation
- Industry Access Programme

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Industry Access Programme (IAP)

- Developed by dedicated industry working group within Rail Delivery Group (RDG)
- Overall aims of working group:
 - Reduce costs
 - Improve service quality for rail users

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Industry Access Programme

- Working Group's new ways of working
 - Better cross-industry access planning (= IAP)
 - Improved productivity and 'time on tools'
 - Removal of redundant/problematic assets (e.g. S&C)
 - Improved cross-industry risk management in infrastructure projects
 - Earlier involvement of RUs in enhancement scoping, planning
 - Operation of additional services
- Savings of £460m - £1bn over CP5

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Industry Access Programme

- Phase 1: ‘IAP Nine Step Approach’
 - Review access requirements for CP5
 - Compare current strategy costs with alternatives
 - Assess delivery/ops trade-offs for different options
 - Obtain cross-industry agreement on preferred option
 - Agree statement on risks, benefits of preferred option
 - Formalise, publish agreed access option
 - Manage change as it occurs in CP
 - Deliver work and amended timetable
 - Review process, outcomes, lessons

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Industry Access Programme

- Phase 1 piloted successfully
- Phase 2
 - Design “new cross industry access and timetable planning process”
 - Savings from reduced costs of M&R, Enhancement, S4CS and timetable and access planning
 - Benefits to users from reduced disruption
- IAP outcomes
 - Reduced costs, increased benefits
 - Consistent with Operational Philosophy

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Alternative Approaches to Scheduling Possessions

- IAP unlikely to be truly optimal – best of assessed options
 - Pragmatic, empirical approach
- International best practice needed as approaches to access are refined further
 - Integrated train and maintenance scheduling
 - IMPROVERAIL project
 - PMSP solutions
 - Etc.

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Summary and Conclusions

- Increasing need to reconcile competing operational and M&R network access requirements
- Automation of S4CS calculations enables RUs to check and forecast IM payments
- Need for and potential benefits of improved cross-industry access planning and cooperation in Britain reflected by IAP
- Industry can and should draw upon international experience and expertise to further enhance the access planning process

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Questions?

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