

ARUP

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



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

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



S4CS Compensation Formulae

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



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

Timetable Data

• PIF (Public Interface Format)

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	6915	TMV	A	17	FYHLSJN	DLTN	10:22:30	10:33:00	-1	0	
	6916	TSP	А	18	DLTN	10:33:00	10:48:00	UGL +00'00	+00'00	N	
	6917	TMV	А	19	DLTN	DINSDAL	10:48:00	11:06:30	0	-1	
	6918	TMV	А	21	DINSDAL	EGLSCLF	11:06:30	11:12:30	-1	-1	
	6919	TSP	А	22	EGLSCLF	11:12:30	11:12:30	+00'00	+00'00	N	
	6920	TMV	A	23	EGLSCLF	STOCCJN	11:12:30	11:14:00	-1	-1	
	6921	TMV	А	25	STOCCJN	HRTBJN	11:14:00	11:15:00	-1	-1	
	6922	TMV	А	27	HRTBJN	NORTONS	11:15:00	11:23:30	-1	-1	
	6923	TMV	А	29	NORTONS	BLNGHMJ	11:23:30	11:26:00	-1	-1	
	6924	TMV	А	31	BLNGHMJ	HRTLEPL	11:26:00	11:39:00	-1	-1	
	6925	TSP	А	32	HRTLEPL	11:39:00	11:39:00	2 +00'00	+00'00	N	
	6926	TMV	А	33	HRTLEPL	SEAHAM	11:39:00	11:53:30	-1	-1	
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Timetable Differences

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3		SG	MP	Direction	T1 Stops	T2 Stops		SG	T1 Train Count	T2 Train Count		Notification Factor:	0.4	45	TT Year	Ending:	2015	
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7	,	SG01	MP4	Forward	27	36		0000										
8		SG01	MP5	Forward	27	35			T1 Total Journey	T2 Total Journey								
9		SG01	MP6	Forward	27	35		SG	Time (hh:mm:ss)	Time (hh:mm:ss)								
1	D	SG01	MP5	Reverse	25	26		SG01	230:42:00	276:55:30								
1	1	SG01	MP3	Reverse	27	29		SG02	77:38:00	100:53:00								
1	2	SG01	MP2	Reverse	28	31		SG03	13:34:00	13:34:00								
1	3	SG01	MP1	Reverse	21	23												
1	4	SG01	MP7	Reverse	1	1		SG	T1 Total Mileage	T2 Total Mileage								=
1	5	SG02	MP8	Forward	16	20		SG01	19500.74297	23049.52813								
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Final Results

Calculated Service Alterations Worksheet.xlsx - Microsoft Excel															
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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	
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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

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

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

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

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

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.



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



Questions?