

The Analysis and Creation of Track
Irregularities Using TRAKVU

by

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The accuracy of the results from a rail vehicle dynamic model is dependent on the realism of the track input to the model. An important part of the track input is the irregularities that exist on actual track. This study analyzes the irregularities inherent in railroad track geometry data, and provides an analytical method for creating track data with the irregularities for use as the input to a dynamic model.

Track data, measured from various classes of track, was examined using statistical and frequency analysis techniques to identify any similarities in the characteristics of the irregularities. The results showed that each class of track had a distinctive value for the standard deviation of the alignment and profile data. It was also determined that the frequency content of all the tracks was contained within a common bandwidth. The track irregularities could then be generated with the same characteristics as an actual track.

The method for creating the track irregularities was then programmed into TRAKVU. TRAKVU is a track preprocessor used in conjunction with NUCARS, a railcar dynamic modeling program¹. TRAKVU enables users to create track data and apply the appropriate irregularities so that the track will have the characteristics of the desired class of track.

A validation was then performed to determine how well track created in TRAKVU simulated actual tracks. The statistical and frequency characteristics of created tracks were compared directly with actual tracks. Created track was also used as the input to a dynamic model. The predicted vehicle response was then compared to the actual vehicle response and the predicted vehicle response using measured track data as the input. The results from the validation showed that the created track performed as well as the measured track in providing the input to the model. Although the predicted response using the created track did not compare as well with the actual vehicle response, this result could be attributed to inaccuracies in the model.

¹ NUCARS and TRAKVU are copyrighted property of the Association of American Railroads.

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Contents

CHAPTER 1 INTRODUCTION	1
1.1 RAIL VEHICLE MODELING	1
1.2 IMPORTANCE OF TRACK INPUT.....	2
1.3 RESEARCH OBJECTIVES	3
1.4 RESEARCH APPROACH.....	3
1.5 OUTLINE.....	4
CHAPTER 2 BACKGROUND.....	5
2.1 LITERATURE SEARCH	5
2.1.1 Track Irregularities.....	6
2.1.2 Rail Vehicle Model	7
2.2 TRACK GEOMETRY	8
2.3 TRACK IRREGULARITIES.....	10
2.3.1 Alignment	10
2.3.2 Gauge.....	11
2.3.3 Profile	12
2.3.4 Cross Level	13
2.4 TRACK CLASS	15
2.5 NUCARS MODELING	15
CHAPTER 3 DATA ANALYSIS.....	18
3.1 TRACK DATA.....	18
3.2 EVALUATE TRACK DATA.....	19
3.3 ANALYSIS.....	21
3.3.1 Statistical Analysis.....	21
3.3.2 Frequency Analysis.....	23
3.4 RESULTS	25
3.4.1 Statistical Results.....	26

3.4.2 Frequency Results	28
3.4.3 Effect of Data Averaging on the Frequency Plots	38
3.5 REPRESENTING PERTURBATIONS	43
CHAPTER 4 TRAKVU.....	46
4.1 BACKGROUND	46
4.2 TRAKVU LAYOUT.....	46
4.2.1 Input Formats	47
4.2.2 Features.....	49
4.2.3 Output Formats	53
4.3 USING TRAKVU TO MODEL TRACK IRREGULARITIES	54
CHAPTER 5 TRAKVU VALIDATION.....	57
5.1 VALIDATION PROCESS	57
5.2 TRACK DATA VALIDATION	57
5.2.1 Track Data Comparison	58
5.2.2 Effect of Data Processing on Track Data	60
5.3 DYNAMIC RESPONSE VALIDATION	64
5.3.1 Description of Track	65
5.3.2 NUCARS Model.....	67
5.3.3 Actual vs. TRAKVU.....	68
5.3.3.1 Pitch and Bounce.....	69
5.3.3.2 Twist and Roll.....	72
5.3.4 Measured vs. TRAKVU.....	75
5.3.4.1 Pitch and Bounce.....	75
5.3.4.2 Twist and Roll.....	79
5.4 CONCLUDING REMARKS	82
5.4.1 Actual vs. TRAKVU.....	82
5.4.2 Measured vs. TRAKVU.....	83

CHAPTER 6 CONCLUSIONS.....	85
6.1 SUMMARY.....	85
6.2 RECOMMENDATIONS FOR FUTURE RESEARCH.....	86
 REFERENCES	 87
 APPENDICES	 A-1
A MATLAB M-Files	A-1
A.1 MATLAB M-File for Calculating Statistical Properties.....	A-2
A.2 MATLAB M-File for Loading Track Geometry Data.....	A-3
A.3 MATLAB M-File for Calculating FFT and Auto Spectrum.....	A-5
B TRAKVU Menu Structure	B-1
C Files Used for NUCARS Simulations	C-1
C.1 RUN Files	C-2
C.2 SYS File	C-6
C.3 INP Files	C-16
C.4 DAT File	C-17
 VITA	 113

List of Figures

Figure 2.1	Literature Search Flow Chart; Parentheses Indicate the Number of “Hits”	6
Figure 2.2	NUCARS Coordinate System.....	8
Figure 2.3	Schematic of Various Types of Track.....	9
Figure 2.4	Track Curvature.....	9
Figure 2.5	Illustration of Track Alignment Deviation.....	11
Figure 2.6	Illustration of Track Gauge Deviation	12
Figure 2.7	Illustration of Track Profile Deviation.....	13
Figure 2.8	Illustration of Track Cross Level Deviation.....	14
Figure 2.9	System of Interconnected Bodies.....	16
Figure 3.1	Test Tracks at the Transportation Technology Center, Inc. in Pueblo, CO	19
Figure 3.2	Track Chart of High Tonnage Loop from the Transportation Technology Center, Inc.	20
Figure 3.3	Dead Spots in the Left Alignment Data of the Railroad Test Track.....	21
Figure 3.4	Histogram of Transit Test Track Alignment Data.....	23
Figure 3.5	Three Hanning Windows with 50% Overlap	24
Figure 3.6	Auto Spectrum of Balloon Loop Track Geometry Data; (a) Alignment Data, (b) Profile Data.....	29
Figure 3.7	Auto Spectrum of HTL Track Geometry Data; (a) Alignment Data, (b) Profile Data	30
Figure 3.8	Auto Spectrum of WRM Track Geometry Data; (a) Alignment Data, (b) Profile Data	31
Figure 3.9	Auto Spectrum of TTT Track Geometry Data; (a) Alignment Data, (b) Profile Data	32
Figure 3.10	Auto Spectrum of RTT Track Geometry Data; (a) Alignment Data, (b) Profile Data	33
Figure 3.11	Comparison of Auto Spectrum of Left Alignment for Class 4 Tracks	34
Figure 3.12	Comparison of Auto Spectrum of Right Alignment for Class 4 Tracks	34
Figure 3.13	Comparison of Auto Spectrum of Left Profile for Class 4 Tracks	35

Figure 3.14 Comparison of Auto Spectrum of Right Profile for Class 4 Tracks	35
Figure 3.15 Comparison of Auto Spectrum of Left Alignment for All Tracks.....	37
Figure 3.16 Comparison of Auto Spectrum of Right Alignment for All Tracks	37
Figure 3.17 Comparison of Auto Spectrum of Left Profile for All Tracks.....	38
Figure 3.18 Comparison of Auto Spectrum of Right Profile for All Tracks	38
Figure 3.19 Result of 62 Foot Mid-Cord Offset Method on Signal with 31 Foot Wavelength.....	40
Figure 3.20 Result of 62 Foot Mid-Cord Offset Method on Signal with 350 Foot Wavelength.....	40
Figure 3.21 Result of 62 Foot Mid-Cord Offset Method on Signal with 62 Foot Wavelength.....	41
Figure 3.22 Characteristics of 62 Foot Mid-Cord Offset Method; (a) Gain Response, (b) Phase Response.....	42
Figure 3.23 Characteristics of Finite Impulse Response Low-Pass Filter; (a) Gain Response, (b) Phase Response.....	44
Figure 4.1 TRAKVU Menu for Setting Up to Read Data	48
Figure 4.2 Flow Chart of Track Creation in TRAKVU.....	49
Figure 4.3 TRAKVU Plot Menu.....	50
Figure 4.4 TRAKVU Plot of Two Variables	51
Figure 4.5 Example of Piece Wise Linear (PWL) Representation	52
Figure 4.6 Example of .PWL File for Use in NUCARS INP File	53
Figure 4.7 Example of Random Track Irregularities.....	54
Figure 4.8 Examples of Basic Shape Irregularities; (a) Sine Wave, (b) Square Wave, (c) Saw Tooth Wave	55
Figure 4.9 Example of Class 5 Track Irregularities.....	56
Figure 5.1 Comparison of Auto Spectrum for Alignment Data of TTT and TRAKVU- Created Track	60
Figure 5.2 Comparison of Auto Spectrum for Profile Data of TTT and TRAKVU- Created Track	60
Figure 5.3 Comparison of Pure Signal, 62 ft MCO Signal, and Filtered Signal.....	62
Figure 5.4 Comparison of Gain Response for Digital Filter and 62 ft MCO Method.....	63

Figure 5.5 Comparison of Auto Spectrum of Filtered Data and 62 ft MCO Data	63
Figure 5.6 Comparison of Auto Spectrum of Actual Track and 62 ft MCO of Random Data	64
Figure 5.7 Plot of Pitch and Bounce Track Section	66
Figure 5.8 Plot of Twist and Roll Track Section.....	66
Figure 5.9 PREVU Picture of Trilevel Autorack	68
Figure 5.10 Comparison of Pitch and Bounce Lateral Wheel Forces for Actual Vehicle Response and Predicted Response Using TRAKVU Track; (a) Left Wheel, (b) Right Wheel	70
Figure 5.11 Comparison of Pitch and Bounce Vertical Wheel Forces for Actual Vehicle Response and Predicted Response Using TRAKVU Track; (a) Left Wheel, (b) Right Wheel	71
Figure 5.12 Comparison of Twist and Roll Lateral Wheel Forces for Actual Vehicle Response and Predicted Response Using TRAKVU Track; (a) Left Wheel, (b) Right Wheel	73
Figure 5.13 Comparison of Twist and Roll Vertical Wheel Forces for Actual Vehicle Response and Predicted Response Using TRAKVU Track; (a) Left Wheel, (b) Right Wheel	74
Figure 5.14 Comparison of Pitch and Bounce Lateral Wheel Forces for Predicted Response Using Measured Track and TRAKVU Track; (a) Left Wheel, (b) Right Wheel	76
Figure 5.15 Comparison of Pitch and Bounce Vertical Wheel Forces for Predicted Response Using Measured Track and TRAKVU Track; (a) Left Wheel, (b) Right Wheel	77
Figure 5.16 Comparison of Twist and Roll Lateral Wheel Forces for Predicted Response Using Measured Track and TRAKVU Track; (a) Left Wheel, (b) Right Wheel	80
Figure 5.17 Comparison of Twist and Roll Vertical Wheel Forces for Predicted Response Using Measured Track and TRAKVU Track; (a) Left Wheel, (b) Right Wheel	81

List of Tables

Table 2.1	Track Class Speed Limits.....	15
Table 3.1	Track Class Means.....	26
Table 3.2	Standard Deviations of Alignment and Profile of All Tracks.....	27
Table 3.3	Track Class Standard Deviations	27
Table 5.1	Statistical Analysis Comparing TRAKVU Track and Actual Track.....	58
Table 5.2	Criteria Used for Creating Pitch and Bounce and Twist and Roll Tracks.....	67
Table 5.3	Statistical Comparison of Actual and TRAKVU Pitch and Bounce Wheel Forces.....	82
Table 5.4	Statistical Comparison of Actual and TRAKVU Twist and Roll Wheel Forces.....	83
Table 5.5	Statistical Comparison of Predicted Pitch and Bounce Wheel Forces	83
Table 5.6	Statistical Comparison of Predicted Twist and Roll Wheel Forces	84