MAXIMUM SPEED IN MILES PER HOUR		0°-15'	0°-30'	0°-45'	1°-00'	1°-15'	1°-30'	1°-45'	2°-00'	2°-15'	2°-30'	2°-45'	3°-00'	3°-15'	3°-30'	3°-45'	4°-00'	4°-15'	4°-30'	4°-45'	5°-00'	5°-15'	5°-30'	5°-45'	6°-00'	6°-15'	6°-30'	6°-45'	7°-00'	7°-15'	7°-30'	7°-45'
10	P	0	0	0	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"
	F	0	0	0	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"
15	P	0	0	0	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"
	F	0	0	0	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"
20	P	0	0	0	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"
	F	0	0	0	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"
25	P	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"
	F	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1½"	1½"	1½"	1½"	1½"	1½"	1½"	1½"	1½"	1½"	1½"
30	P	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1½"	1½"	1½"	1½"	2"	2"	2"	2½"
	F	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1½"	1½"	1½"	1½"	1½"	1½"	1½"	2"	2"	2"	2½"	2½"	2½"	3"	3"	3"
35	P	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1½"	1½"	2"	2"	2"	2½"	2½"	3"	3"	3"	3½"	3½"	3½"	4"
	F	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1½"	1½"	1½"	1½"	2"	2"	2"	2½"	2½"	3"	3"	3"	3½"	3½"	3½"	4"	4"			
40	P	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1½"	1½"	1½"	2"	2½"	2½"	3"	3"	3½"	3½"	4"	4"	4"	4½"	5"	5"			
	F	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1½"	1½"	2"	2"	2½"	2½"	3"	3½"	3½"	3½"	4"	4"									
45	P	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1½"	1½"	2"	2½"	2½"	3"	3½"	4"	4"	4½"	5"	5"									
	F	1"	1"	1"	1"	1"	1"	1"	1½"	1½"	2"	2"	2½"	3"	3"	3½"	4"	4"														
50	P	1"	1"	1"	1"	1"	1"	1"	1"	1½"	2"	2½"	2½"	3"	3½"	4"	4"	4½"	5"													
	F	1"	1"	1"	1"	1"	1"	1½"	1½"	2"	2½"	3"	3½"	4"	4"																	
55	P	1"	1"	1"	1"	1"	1"	1½"	1½"	2"	2½"	3"	3½"	4"	4½"	5"																
	F	1"	1"	1"	1"	1"	1½"	2"	2½"	3"	3½"	4"																				
60	P	1"	1"	1"	1"	1"	1½"	2"	2½"	3"	4"	4"	5"				4°-00'	4°-15'	4°-30'	4°-45'	5°-00'	5°-15'	5°-30'	5°-45'	6°-00'	6°-15'	6°-30'	6°-45'	7°-00'	7°-15'	7°-30'	7°-45'
	F																															
65	P	1"	1"	1"	1"	1½"	2"	2½"	3"	4"	4½"																					
	F																															
70	P	1"	1"	1"	1"	1½"	2½"	3½"	4"	5"																						
	F																															
75	P	1"	1"	1"	1½"	2½"	3"	4"	5"																							
	F																															
80	P	1"	1"	1½"	2"	3"	4"	5"																								
	F																															
MAXIMUM SPEED IN MILES PER HOUR		0°-15'	0°-30'	0°-45'	1°-00'	1°-15'	1°-30'	1°-45'	2°-00'	2°-15'	2°-30'	2°-45'	3°-00'	3°-15'	3°-30'	3°-45'																

MAXIMUM SPEED IN MILES PER HOUR		8°-00'	8°-15'	8°-30'	8°-45'	9°-00'	9°-15'	9°-30'	9°-45'	10°-00'	10°-30'	11°-00'	11°-30'	12°-00'	12°-30'	13°-00'	13°-30'	14°-00'	14°-30'	15°-00'	15°-30'	16°-00'	16°-30'	17°-00'	17°-30'	18°-00'	18°-30'	19°-00'	19°-30'	20°-00'
10	P	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1½"	1½"	1½"
	F	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1½"	1½"	1½"	1½"	1½"	1½"	1½"	1½"	1½"	1½"	1½"
15	P	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1½"	1½"	1½"	1½"	1½"
	F	1"	1"	1"	1"	1½"	1½"	1½"	1½"	1½"	1½"	1½"	1½"	1½"	1½"	1½"	1½"	1½"	1½"	1½"	1½"	1½"	1½"	1½"	1½"	1½"	1½"	1½"	1½"	1½"
20	P	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1½"	1½"	1½"	1½"	1½"	1½"	1½"	2"	2"	2"	2½"	2½"	2½"	2½"	3"	3"	3"
	F	1½"	1½"	1½"	1½"	1½"	1½"	1½"	1½"	1½"	1½"	1½"	1½"	1½"	1½"	2"	2"	2"	2½"	2½"	2½"	3"	3"	3"	3"	3½"	3½"	3½"		
25	P	1"	1"	1½"	1½"	1½"	1½"	1½"	1½"	2"	2"	2½"	2½"	3"	3"	3"	3"	3½"	3½"	4"	4"									
	F	1½"	2"	2"	2"	2"	2½"	2½"	2½"	2½"	2½"	3"	3"	3½"	3½"	3½"	4"	4"												
30	P	2½"	2½"	3"	3"	3"	3"	3½"	3½"	3½"	4"																			
	F	3½"	3½"	3½"	3½"	3½"	4"	4"																						
35	P	4"																												
	F																													

P - PASSENGER

F - FREIGHT

NOTES

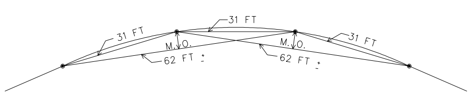
1. STANDARD PLAN 7-2 SHALL BE USED TO DETERMINE THE PROPER ELEVATION FOR CURVES AFTER TAKING INTO ACCOUNT THE DEGREE OF CURVATURE, TYPE OF TRAFFIC, LOCATION, GRADE AND SPEED. LOCAL CONDITIONS ARE IMPORTANT FACTORS WHICH MUST BE CONSIDERED IN MAKING THIS DETERMINATION. ALL EXCEPTIONS SHALL BE APPROVED BY AVP - MAINTENANCE.
2. A PERMANENT RECORD OF THE PROPERTIES OF CURVES, INCLUDING LOCATION, DEGREE OF CURVATURE, DESIGNATED ELEVATION, SPIRAL LENGTHS, CURVE LENGTHS AND MAXIMUM ALLOWABLE OPERATING SPEED SHALL BE MAINTAINED BY THE AVP - MAINTENANCE.
3. WHENEVER A CHANGE IN ALIGNMENT OR PROGRAM BALLASTING IS PROPOSED, THE DIVISION ENGINEER SHALL ESTABLISH THE NEW ALIGNMENT AND ELEVATION PRIOR TO THE BEGINNING OF WORK.
4. THE INNER RAIL SHALL BE MAINTAINED AS THE GRADE RAIL, AND THE DESIGNATED ELEVATION OBTAINED BY RAISING THE OUTER RAIL.
5. ON CURVES WHERE PASSENGER AND FREIGHT TRAINS BOTH OPERATE, THE HIGHER SUPERELEVATION IS TO BE USED.
6. THE DESIGNATED ELEVATION MUST BE PROVIDED BETWEEN SPIRALS UNLESS PROHIBITED BY PHYSICAL CONDITIONS. IN THAT CASE, THE ELEVATION THAT IS PROVIDED SHALL BE USED TO DETERMINE THE MAXIMUM OPERATING SPEED. WHERE A SPRIAL LENGTH IS TOO SHORT TO PROVIDE FOR A FULL RUNOFF, A PORTION OF THE RUNOFF, NOT EXCEEDING ONE INCH MAY BE EXTENDED ON TO TANGENT TRACK.
7. SPECIAL CONDITIONS NOT COVERED BY THESE INSTRUCTIONS SHALL BE REFERRED TO AVP - MAINTENANCE.
8. SPEEDS SHOWN SHALL NOT BE EXCEEDED UNDER ANY CONDITION.

SUPERELEVATION

CURVES SHALL BE SUPERELEVATED FOR THE MAXIMUM ALLOWABLE SPEED OF TRAINS IN ACCORDANCE WITH TABLE.

THE MAXIMUM SUPERELEVATION SHALL NOT EXCEED 4 INCHES FOR FREIGHT TRAINS UNLESS APPROVED BY AVP-MAINTENANCE. THE MAXIMUM SUPER-ELEVATION SHALL NOT EXCEED 5 INCHES FOR PASSANGER TRAINS.

FOR CURVES UNDER 10°-00', IF THE CURVATURE IS 06 MINUTES HIGHER THAN THE FIGURE LISTED ABOVE, THE NEXT ELEVATION SHALL BE USED; i.e., A 2°-06' CURVE SHALL BE ELEVATED AS IF IT WERE A 2°-15' CURVE. SIMILARLY, FOR CURVES OVER 10°-00', IF THE CURVATURE IS 11 MINUTES HIGHER THAN THE FIGURE LISTED ABOVE, THE NEXT ELEVATION SHALL BE USED; i.e., A 13°-11' CURVE SHALL BE ELEVATED AS IF IT WERE A 13°-30' CURVE.



31 FT STATIONS

THE DEGREE OF CURVE MAY BE ASCERTAINED BY THE SAME METHOD AS USED FOR STRING LINING:

USE THE OUTER RAIL AND DIVIDE INTO STATIONS 31 FT APART ALONG THE GAGE LINE ⅝ INCH BELOW THE TOP OF RAIL.

STRETCH A LINE BETWEEN TWO STATIONS WHICH ARE APPROXIMATELY 62 FT APART AND MEASURE THE MIDDLE ORDINATE "M.O." WHICH WILL EQUAL 1 (ONE) INCH FOR EACH 1 (ONE) DEGREE OF CURVE.

APPROACH AND RUNOFF SPIRALS

THE LENGTH OF SPIRAL IS TO BE BASED ON THE MAXIMUM ALLOWABLE SPEED OF TRAINS AND WHERE PRACTICAL, SHALL BE SUCH AS TO PERMIT THE ATTAINING OF FULL SUPERELEVATION IN THE LENGTH OF SPIRAL.

THE DESIRABLE RATE OF CHANGE IN SUPER ELEVATION IS:
3/8 INCH IN 31 FEET FOR SPEEDS OVER 60 M.P.H. AND UP TO 80 M.P.H. INCLUSIVE.
1/2 INCH IN 31 FEET FOR SPEEDS UP TO 60 M.P.H. INCLUSIVE.

THE MAXIMUM ACCEPTABLE RATE OF CHANGE IN SUPERELEVATION IS:
5/8 INCH IN 31 FEET WILL BE PERMITTED FOR SPEED NOT EXCEEDING 40 M.P.H.
3/4 INCH IN 31 FEET WILL BE PERMITTED FOR SPEED NOT EXCEEDING 20 M.P.H.

SPIRALS SHALL BE PROVIDED AT BOTH ENDS OF CURVES AND BETWEEN BRANCHES OF COMPOUND CURVES. AN EASEMENT CURVE SHALL BE USED WHICH IS A CUBIC PARABOLA, OR OF THE GENERAL FORM OF A CUBIC PARABOLA SUCH AS THE AREMA 10-CHORD SPIRAL.

NORFOLK SOUTHERN RAILWAY COMPANY

SUPERELEVATION OF CURVES FOR MAXIMUM SPEEDS

MARCH 1991

Atlanta, Georgia

DATE	REVISION
2-23-00	ADDED SUPERELEVATION FOR 55 MPH FREIGHT