

ALASKA POLICY ON RAILROAD/HIGHWAY CROSSINGS
Revised September 1988

1.0 INTRODUCTION

The goal of any transportation agency is to provide for the safe, efficient, and economical movement of people, goods and services. It is a continuing challenge to seek the proper balance between safety, efficiency and economy to bring the greatest good to the most people within the constraints of available resources.

With the acquisition of the Alaska Railroad by the State, continued population growth, and decreasing financial resources, the need for a more uniform statewide program to provide safe railroad/highway grade crossings became apparent.

Responding to this need, the Commissioner of the Department of Transportation and Public Facilities (DOT&PF), and the President and Chief Executive Officer of the Alaska Railroad Corporation (ARRC), established a Task Force on Rail/Highway Crossings composed of representatives of their agencies and the Federal Highway Administration (FHWA).

At the Task Force's first meeting on October 29, 1985, the Commissioner outlined his concept of the three subtasks required to carry out his charge to the Task Force:

1. After referring to available technology and standards, determine the reasonable type of protection for each "class" of crossing.
2. Inventory all crossings in the State to determine the appropriate protection "classes".
3. Develop a reasonable structured priority system to implement improvements through a rational and systematic allocation of available resources.

Within these subtasks, the Task Force set out to accomplish this change and make the Alaska highway system and Alaska Railroad safer for the traveling public.

1.1 1988 Policy Revision

Early in 1988 it became apparent that this policy needed to be revised to include more information on sight triangles and how diagnostic teams function. A total of four work sessions were held (2 in Anchorage and 2 in Fairbanks). The procedures in new Section 5.1 were used in developing the revised policy.

2.0 DISCUSSION

Most crossings of the Alaska Railroad Corporation (ARRC) are under permit to the agency (State or local) which has the road authority. The terms of the permit make the road agency responsible for construction and maintenance costs associated with the permitted road crossing, and for claims resulting from the construction, maintenance and use of the road crossing.

The Task Force, with the assistance of the FHWA and the Federal Railroad Administration (FRA), reviewed the latest safety resource allocation techniques, including an accident prediction model developed through FHWA research. FHWA's research was aimed at establishing a national standard for planning crossing improvements.

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2.0 DISCUSSION - continued

The computed "DOT Accident Prediction Value" (APV) of a crossing is the product of a series of factors representing the various characteristics of the crossing, and is equivalent to the expected number of accidents per year at that crossing.

The State Inventory was completed and the APV's of all crossings were computed. A graph was made of the number of crossings exceeding the various values of APV, and this was compared to a similar graph developed by the FHWA/FRA for all crossings in the nation. On a percentage basis, the two graphs were very similar. The Task Force found that the crossings with the highest APV's are generally those that are already known to be in need of improvement, many of which are already programmed or in progress.

The FHWA resource allocation model develops threshold values of the APV to determine the optimum cost-effective safety improvement decisions at each crossing.

With the exception of grade separations, the biggest decision is whether or not to install active warning devices (train activated flashing lights or flashing lights and gates). The allocation model arrives at an APV of 0.1 as the cost-effective threshold value for considering going from passive devices only (signs, markings) to active protection. Rapidly decreasing safety benefits along with rapidly rising costs are associated with an APV less than a value near 0.1, both for the national inventory and the state distribution. When this criterion is applied to the State's crossings, the Task Force found that it resulted in a program that can be accomplished in a reasonable time within the available State and federal resources.

In addition, this technique meets the federal requirement of a rational prioritization scheme for using federal crossing safety improvement funds.

The Task Force noted that this prioritization system is only an indicator of the probable treatment required at a given crossing in order to concentrate efforts where they are most urgently needed. In other words, the final decision as to what major treatment is required at a crossing would be based on an on-site evaluation by a professional diagnostic team, and the APV criterion would not normally be blindly followed, especially for borderline cases. There will be instances in which an evaluation reveals that relatively low-cost improvements such as increased sight-distance in conjunction with better signing might change the accident potential to a level that would not require active devices which are expensive to install and maintain, thereby freeing funds to be applied where they would do more good.

It is also imperative that local jurisdictions be brought into the diagnostic process when they are affected by the engineering decision. Likewise, local jurisdictions, developers, and other State agencies that have the potential to create a rail/highway safety conflict must take this into account in their planning functions, and should be responsible for their fair share of any costs created by their actions.

Provision should be made to maintain the program through regular updating of the inventory and priority list, and periodic evaluation of the effectiveness of the improvements made.

The following subsections summarize the results of the Task Force investigations and deliberations.

3.0 DEFINITIONS

- 3.1 The U.S. Department of Transportation (DOT)/Association of American Railroads (AAR) National Railroad-Highway Crossing Inventory Procedures Manual ("Procedures Manual") defines public and private crossings as follows:

"Public Crossing: A public crossing is a location where the tracks cross a road which is under the jurisdiction of and maintained by a public authority and which is open to public travel."

"Private Crossing: A private crossing is a location where a physical crossing is present but the road does not meet the conditions indicated above for a public crossing. Private crossings usually restrict public use by an agreement which the railroad has with the property owner, or by gates or similar barriers."

- 3.2 When the Task Force looked at the inventory of crossings on the Alaska Railroad, it became apparent that there are numerous crossings that are open to public travel but not "under the jurisdiction of and maintained by a public authority." The Procedures Manual also states "In some instances changes in land use have resulted in an expansion of crossing use to the extent that it has become a public crossing in fact, whether or not any public agency has accepted responsibility for maintenance or control of the use of the traveled way over the crossing. The railroad company and highway agency should make every effort to mutually resolve and agree on the appropriate classification (either public or private) of questionable crossings."
- 3.3 The Task Force recognized the problem of crossings that are open to public travel but are not under the jurisdiction of and maintained by a public authority. To be able to move forward and identify the magnitude of the problem, the Task Force developed and assigned the designation of "PUB-4" to this type of crossing.
- 3.4 The Task Force's definition is: "PUB-4. A crossing that is open to the public but the road is not maintained by a public authority." Open to the public means that (1) there is no restriction placed upon the use of the crossing; (2) if there is a gate, the gate is not being closed to restrict the use of the crossing; (3) there is more than one user regularly using the crossing; or (4) the roadway serves more than one piece of property on the opposite side of the tracks. One or more of these conditions may exist today on a truly "private" crossing. With the exception of serving more than one piece of property, most existing private crossings could be made to fit this definition.
- 3.4.1 While the problems are the most acute in the Fairbanks North Star Borough, other boroughs, cities and municipalities have PUB-4 crossings. These include the Matanuska-Susitna Borough, Kenai Peninsula Borough, Municipality of Anchorage, City of Houston, City of Nenana, City of North Pole, and City of Seward. To be eligible for federal funding, the road authority must be responsible for the maintenance and meet the standards for public crossings as defined by the DOT/AAR Railroad-Highway Crossing Inventory Procedures Manual.

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3.0 DEFINITIONS - continued

- 3.5 The roadway crossing at a PUB-4 crossing may have a designated street name, may be recognized as a public roadway and may be platted as such on either side of the railroad right-of-way.
- 3.6 The only known PUB-4 crossings outside of the boundaries of local government are the crossings at Cantwell (ARRC MP 319.6), at Ferry (ARRC MP 371.1), and North Nenana (ARRC MP 415.5). The first two crossings are at the end of State-maintained roads.
- 3.7 For the area outside of the organized boroughs (Broad Pass to Dunbar), the Task Force recognized the problem of no planning agency. To be able to properly plan the development in this area, all state and federal agencies having land in this area must work together.

3.8 Sight Triangles

3.8.1 A sight triangle for at-grade crossings is an area free of obstructions, which allows a motor vehicle operator approaching an at-grade crossing to safely observe a train approaching the crossing. The size of the sight triangle is based upon maximum train speeds and the posted highway speed. A table of sight triangle distances is shown in Appendix "A". There are two scenarios with regard to sight triangles:

- a. Case I involves a moving vehicle approaching the crossing at the posted speed limit and the train traveling at the maximum speed approved for that location.
- b. Case II involves a stopped vehicle departing from the crossing and the train traveling at the maximum speed approved for that location.

3.8.2 The table in Appendix "A" is based on the latest sight triangle calculations available and has been agreed to by the ARRC and DOT&PF. It will not be changed without concurrence of both parties.

3.9 New Crossing

- 3.9.1 A new crossing is a crossing that is being proposed where there is currently no crossing in existence.
- 3.9.2 Construction of a crossing at a new location that is replacing an existing crossing in the same vicinity will be seen as a major improvement project and not considered a new crossing.

3.10 Highway

For the purposes of this policy, the words "highway", "road", and "roadway" are synonymous.

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4.0 POLICIES

4.1 General

- 4.1.1 All crossings should be brought up to the basic safety standards in the Alaska Traffic Manual.
- 4.1.2 New construction will adhere to the standards in the Alaska Traffic Manual, Association of American Railroads (AAR) Rail/Highway Grade Crossing Handbook, and other State standards for the installation of passive and active warning devices.
 - 4.1.2.1 Sight distances, track profile, drainage and train operation will all be factors considered in the design and improvement of crossings. The Railroad-Highway Grade Crossing Handbook, Federal Highway Administration Publication TS-86-215 (or revision) and current State of Alaska design standards thereof will be consulted in the design of crossings.
- 4.1.3 12-inch roundels for flashing lights, and RR crossbucks with high intensity reflective sheeting on both sides should be adopted as a standard in the State of Alaska.
- 4.1.4 DOT&PF and the ARRC will update the FRA National Rail/Highway Crossing Inventory annually or more frequently if significant changes are discovered, and use this data base to compute the crossing Accident Prediction Values.
- 4.1.5 "Operation Lifesaver" should be actively supported and participated in by the ARRC, DOT&PF, local governments and law enforcement agencies.
- 4.1.6 The ARRC and DOT&PF should arrange meetings with all local governmental planning and road agencies in the railbelt. These meetings would be used to discuss the results of the Task Force and set up procedures for implementing these recommendations.

4.2 Planning

- 4.2.1 Local jurisdictions, state and federal agencies, and private enterprise should incorporate planning processes (a) aimed at minimizing the need for at-grade crossings and traffic at existing at-grade crossings; and (b) which will evaluate the effect on a crossing by changes in zoning, approval of new subdivisions and other elements of the planning process. Estimated future Accident Prevention Values based on the proposed activity and future highway and railroad traffic densities will be used in the evaluation of the crossings. New at-grade crossings are discouraged and no new crossings will be permitted without concurrence of the appropriate diagnostic team.

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4.0 POLICIES - continued

4.2 Planning - continued

- 4.2.2 Agencies, authorities, jurisdictions, and/or private enterprise whose actions have an impact on the crossings should be required to participate in the funding of the construction and maintenance costs precipitated by those actions. For construction, this could include the matching funds (10%) if federal funding is available.
- 4.2.3 The ARRC and DOT&PF should arrange a meeting with the Bureau of Land Management (BLM), Department of Natural Resources (DNR), National Park Service (NPS), Community and Regional Affairs Department, and Division of Parks and Outdoor Recreation to review the planning processes for the area in the unorganized boroughs.

4.3 Diagnostic Team

- 4.3.1 A professional diagnostic team should perform an on-site evaluation before any major improvement is planned for an existing crossing or a new crossing is approved.
- 4.3.2 Diagnostic teams should include as a minimum:
- a. Alaska Railroad Corporation
 - b. DOT&PF Region
 - c. Borough (Kenai Peninsula, Municipality of Anchorage, Matanuska-Susitna, or Fairbanks North Star as appropriate)
 - d. The city when within incorporated city limits
 - e. Proposed permittee of the crossing if not one of the above entities

Where appropriate, representatives of the following should be informed and invited to assist the diagnostic team:

- a. The FHWA;
 - b. DOT&PF Headquarters;
 - c. School District;
 - d. Municipality or other local agency; and
 - e. Law enforcement agency(ies);
- 4.3.3 The recommendation of the diagnostic team will be forwarded to the appropriate parties involved for action. The action at the crossing shall be in accordance with the permit and construction agreement with the ARRC.
- 4.3.4 The diagnostic teams should always consider the feasibility of eliminating crossings if this can be accomplished with safety benefits which outweigh the increased operational costs and inconvenience to users, and if it would not shift the safety problem to another area, or increase the area-wide hazard potential.

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4.0 POLICIES - continued

4.3 Diagnostic Team - continued

- 4.3.5 Diagnostic teams may be initiated by request of any interested party. The request is to be forwarded to the ARRC Chief Engineer. The Chief Engineer will arrange for the notification of the team members and establish the location and time for the meeting.
- 4.3.6 Where there are majority and minority Policies from the Diagnostic Team, it will be referred to a resolution committee. The committee will consist of the ARRC President and CEO, the DOT&PF Commissioner, and the chief administrator of the local jurisdiction. For crossings outside of a local jurisdiction, the Commissioner of Community and Regional Affairs will be the third person.

4.4 Existing Crossings

- 4.4.1 The DOT Accident Prevention Value (APV) should be used as one factor in classifying and prioritizing crossings for improvements.
- 4.4.2 Diagnostic teams should consider an APV of 0.1 (one accident every 10 years) as an indicator of probable need to go from passive to active warning devices.
- 4.4.3 Diagnostic teams should evaluate crossings which have an APV greater than 0.1 to determine the feasibility of providing grade separations (overpass/underpass) or increasing the level of protection of the warning devices. Table VIII-1 Quantitative Procedures in the Alaska Traffic Manual will be used as part of the process for determining possible upgrades of the existing crossing. The current table is shown in Appendix "B." If the Alaska Traffic Manual is revised, Appendix B will automatically become the revised Table VIII-1.
- 4.4.4 Where possible, upgrades and improvements should be accomplished when there is another project affecting the roadway or railway in the area of the crossing.
- 4.4.5 Sight triangles for at-grade road crossings shall be maintained to the minimum required by Appendix A. As a minimum, all crossings shall have Case II sight triangles except for certain industrial tracks.

In industrial areas, where local roads cross industrial tracks, there are crossings where the Case II requirements cannot be met due to building construction next to the track and road. In these cases, the ARRC will issue instructions that the crossing must be flagged by ARRC personnel prior to entering the crossing.

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4.0 POLICIES - continued

4.4 Existing Crossings - continued

4.4.5 continued

Case I sight triangles are desirable at all crossings, however, they are difficult and often impractical to achieve, except possibly in flat, open terrain.

4.4.5.1 When Case I sight triangles cannot be provided at a public crossing, a diagnostic team shall review the crossing. The team could, in addition to closing the crossing, propose one of the following requirements:

- a. Active warning devices installed.
- b. A crossing with low highway volume and low highway speed may have an advisory speed posted that is consistent with the sight triangles that can be provided. In no case should the difference in the posted speed and the advisory speed be greater than 10 miles per hour.

Low highway speeds generally mean 40 mph or less. Low highway volume is generally in the range of less than 500 vehicles per day.

- c. Stop signs installed if the Alaska Traffic Manual requirements for stop signs can be met.

4.4.5.2 If the maximum authorized train speed or posted highway speed are increased, the sight triangle requirements will be recalculated. If the new sight triangles are impractical to achieve, the provisions of Section 4.4.5.1 will apply.

4.5 New Crossings

4.5.1 New crossings must be part of a comprehensive community plan. For the area between Broad Pass and Dunbar (unorganized borough), DOT&PF or Community and Regional Affairs Department (or the appropriate State agency) will be required to develop the plan. The comprehensive community plan must address factors such as future growth in the area, existing local governmental agencies, land ownership, geographical restrictions, availability and/or restrictions of natural grade separation locations.

4.5.2 New at-grade crossings should not be allowed if there is another crossing within two miles of the proposed new location, nor if there is a reasonable alternative to a crossing such as a feeder road. Exception may possibly be made after the diagnostic team review. Factors to be considered would include terrain conditions which make alternative access impossible or economically unfeasible.

4.0 POLICIES - continued

4.5 New Crossings - continued

- 4.5.3 It will be the responsibility of the government authority having road jurisdiction in the area of the proposed crossing to hold the necessary public hearings to insure that the road will be located so as to efficiently connect into future road networks. It will also be that governmental authority's responsibility to handle all protests concerning crossing location.
- 4.5.4 A professional diagnostic team will perform an on-site evaluation before any new crossing is approved. Factors to be considered by the diagnostic team include:
- 4.5.4.1 Any new crossing will likely become a permanent crossing and possibly become a major roadway.
 - 4.5.4.2 The proximity of the proposed new crossing to existing crossing and/or other planned crossings.
 - 4.5.4.3 The effect the construction of the new crossing will have on the elimination of one or more existing crossings, making the transportation network safer and better able to serve the road needs of the area.
 - 4.5.4.4 The grade of approaches to all crossings should be level with top of rail ($\pm 1"$) for at least 100' to prevent long low trailers from hitting the crossing.
 - 4.5.4.5 Roadway approaches to the crossing should be at or nearly 90°. Short radius curves or skew angle approaches below 75° will not be permitted.
 - 4.5.4.6 For public crossings, the road must have a dedicated right-of-way on both sides of the Alaska Railroad track right-of-way. The dedicated road right-of-way must include dedicated clear sight triangles for maximum design highway and train speeds.
 - 4.5.4.7 For private crossings, the owner must own or secure road right-of-way and sight triangles for maximum design speeds. The private owner will be restricted from developing within the sight triangles.
 - 4.5.4.8 The dedicated sight triangles referenced in 4.5.4.6 and 4.5.4.7 are for Case I and Case II scenarios. If the Case I sight distances cannot be achieved, automatic crossing signals will be required.
 - 4.5.4.9 Sight triangles for at-grade road crossings shall be maintained to provide the sight distances required for both Case I and Case II scenarios.

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4.0 POLICIES - continued

4.5 New Crossings - continued

- 4.5.5 The DOT Accident Prediction Values will be used as a factor in determining protection at new crossings. The new crossing will also be compared to existing crossings of similar geometric characteristics and rail and highway traffic densities. The comparison will also consider accident history and the effect of accidents on the DOT Accident Prediction Value.
- 4.5.6 The crossing permit issued by the ARRC for private crossings will be recorded as an encumbrance against the real property benefited by the crossing including the restriction on sight triangles, with the obligations of the permit to remain appurtenant to the real property.
- 4.5.7 For public crossings, the ARRC will only issue the permit to the DOT&PF or government authority having road construction and maintenance jurisdiction at the location of the crossing.

4.6 Private Crossings

- 4.6.1 Existing truly "private" crossings and new private crossings will be deemed public when any of the following occur:
- 4.6.1.1 The crossing serves two or more parcels of property, unless all parcels are owned or leased by the same permittee;
- 4.6.1.2 The use of the crossing cannot be or is not controlled by the permittee of the crossing;
- 4.6.1.3 The roadway is designated by plat as a public roadway by the governmental authority responsible for planning and/or zoning; or
- 4.6.1.4 If school buses or mass transit vehicles use the crossing unless the school district notifies the ARRC in writing that it will operate across the private crossing and has permission of the permittee.
- 4.6.2 Some existing private crossings currently serve more than one parcel of property. The crossing may remain as a private crossing as long as there is not further subdivision of the property.
- 4.6.2.1 Private crossings may serve property owned or leased by more than one person or entity provided the following conditions are met:
- a. The roadway is not open to public travel, and
 - b. The permit for the crossing has been executed by all owners/lessees of all property which can gain access from the crossing or a legally formed association of property owners.

4.0 POLICIES - continued

4.6 Private Crossings - continued

- 4.6.3 If the permittee no longer complies with the conditions of the "Private Crossing Permit" and the crossing has not become a public crossing, the ARRC will notify the permittee of the deficiencies. If the permittee fails to correct the deficiencies, the crossing will be removed at the permittee's expense.
- 4.6.4 If the crossing's use has become public, the ARRC will work with the appropriate public authority to permit the crossing as a public crossing. A diagnostic team shall review the crossing prior to the issuance of the public crossing permit. The diagnostic team will recommend improvements to the crossing required to bring it into conformance with current design standards.
- 4.6.5 If the public authority refuses to accept the responsibility for the public crossing, the permittee of the crossing shall take appropriate action (if possible) to make the crossing "private". If the permittee fails to correct the deficiencies, the ARRC will remove the crossing at the permittee's expense.
- 4.6.6 Where Case I sight triangles are impractical to achieve at a private crossing, stop signs shall be posted at the crossing and Case II sight triangles will be maintained.

4.7 PUB-4 Crossings

- 4.7.1 ARRC and DOT&PF should involve the local governments and use diagnostic teams to address the problems of these crossings. The local public authority with road powers must make decisions on the continuing need for the crossing balanced with the cost and liability of maintaining the crossings.
 - 4.7.1.1 Diagnostic teams should be formed as soon as possible with each governmental agency which has PUB-4 crossings within its boundaries.
- 4.7.2 The use of ARRC right-of-way to eliminate a crossing will be reviewed on a case by case basis. When development has occurred and natural physical obstructions such as lakes and rivers prevent alternate access, the ARRC may permit to the public authority a road on ARRC right-of-way to facilitate the removal of one or more crossings. The use of ARRC right-of-way should only be permitted after a diagnostic team review and coordination with the local planning and zoning agency.

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4.0 POLICIES - continued

4.7 PUB-4 Crossings - continued

4.7.3 Roadway signing at the PUB-4 crossing should be in accordance with the Alaska Traffic Manual and include as a minimum:

4.7.3.1 Stop sign on both sides of the track unless a diagnostic team determines that stop signs are not required;

4.7.3.2 Crossbuck on both sides of the track;

4.7.3.3 Railroad advance warning signs (W10 Series) according to the Alaska Traffic Manual; and

4.7.3.4 An "ARRC Property-Proceed at Your Own Risk" sign at the right-of-way line on both sides of the track.

5.0 CHANGES AND ADOPTION OF POLICY

5.1 Changes to Policy

5.1.1 This policy was developed by a process that included input from the local governmental bodies. Changes to the policy will be developed in accordance with the following subsections.

5.1.2 The proposed changes will be coordinated by the ARRC Engineering Department and DOT&PF Headquarters Engineering and Operations Standards Section. DOT&PF will coordinate with the Federal Highway Administration.

5.1.3 Work sessions on the proposed changes will be held in Anchorage and Fairbanks. All government agencies concerned with crossings will be notified of the meeting and encouraged to attend.

5.1.4 After the work sessions, the changes will be reviewed by the ARRC and DOT&PF and all parties in attendance at the work sessions before being finalized.

5.2 Adoption and Implementation of Policy

5.2.1 Section 42.40.180 of the Alaska Railroad Corporation Act mandates that policies which affect the general public require adoption by the ARRC Board as a board rule once public notification has been made and a public hearing has been held on the Rule. In accordance with this procedure the proposed changes (see 5.1.4) will be submitted to the ARRC Board of Directors for approval in accordance with Board rules.

5.2.2 After adoption of the changes by the ARRC Board of Directors and concurrence by DOT&PF, the ARRC Policies and Procedures Manual relating to the Railroad Crossing Policy will be updated to incorporate the changes.

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APPENDIX A

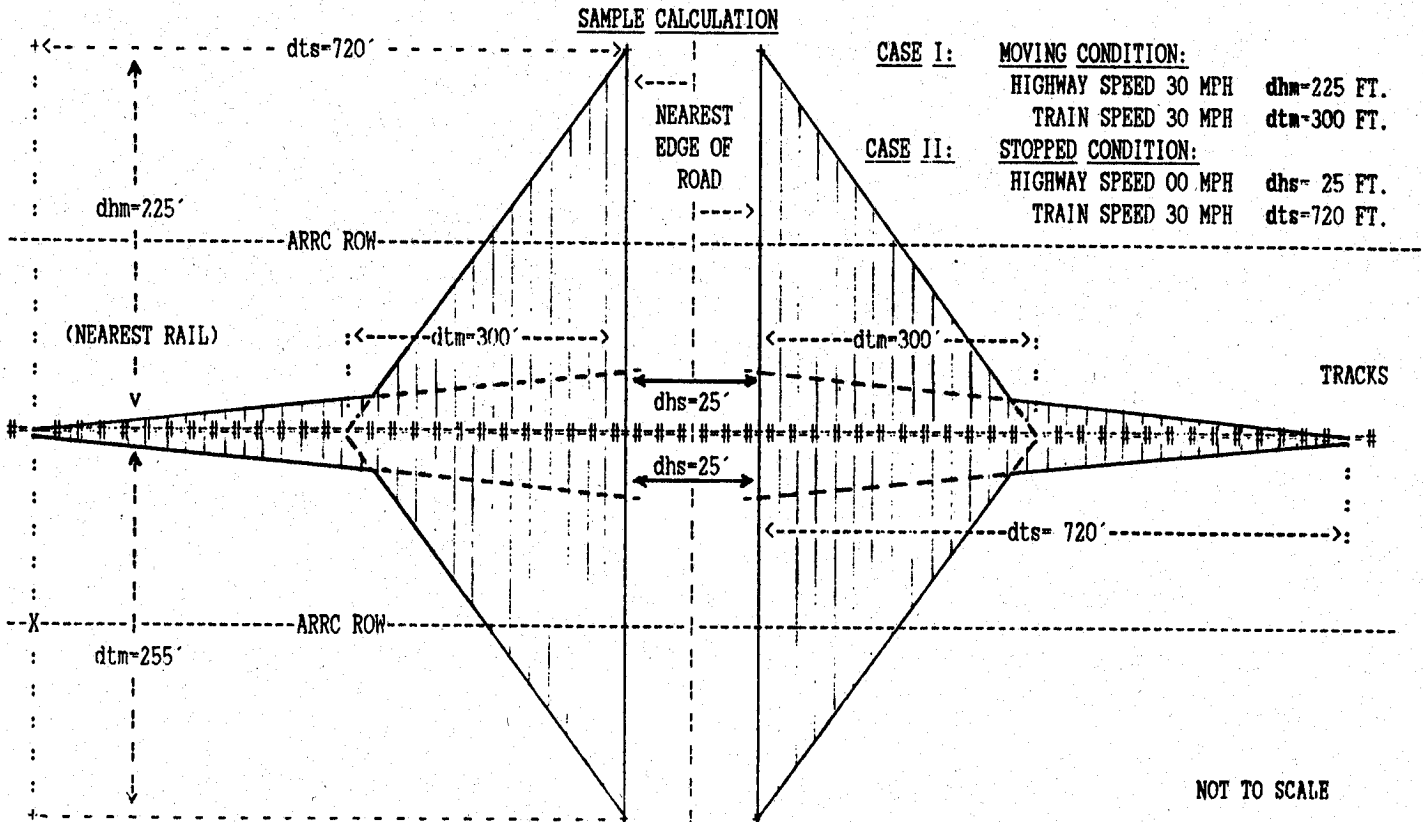
SIGHT TRIANGLE DISTANCE TABLE

		ASSUMED VEHICLE SPEED (MPH)														
		0	5	10	15	20	25	30	35	40	45	50	55	60	65	70
TRAIN SPEED:		DISTANCE ALONG RAILROAD FROM CROSSING (FT.)														
(MPH)	dts	dtm														
5	120	125	75	60	55	50	50	50	55	55	60	60	65	65	70	
10	240	245	145	120	105	100	100	100	105	110	115	120	125	130	135	
15	360	365	220	175	155	150	150	150	155	165	170	175	185	195	205	
20	480	485	290	235	210	200	200	200	210	215	225	235	245	255	270	
25	600	605	365	290	260	250	250	250	260	270	285	290	310	320	340	
30	720	725	435	350	310	300	300	300	310	325	340	350	370	385	405	
35	840	845	510	410	365	345	345	350	365	380	395	410	430	445	470	
40	960	965	580	465	415	395	395	400	415	430	450	465	490	510	540	
45	1080	1085	655	525	465	445	445	450	465	485	505	525	555	575	605	
50	1200	1205	725	580	520	495	495	500	520	540	565	580	615	635	675	
55	1320	1325	800	640	570	545	545	550	570	590	620	640	675	700	740	
60	1440	1445	870	695	620	595	595	600	620	645	675	700	735	765	810	
		DISTANCE ALONG HIGHWAY FROM CROSSING (FT.)														
dhs	dtm															
25	45	70	100	135	175	225	275	340	410	490	565	660	750	865		

NOTE: ALL CALCULATED DISTANCES ROUNDED UP TO NEXT HIGHER 5-FOOT INCREMENT.

ASSUMPTIONS: SIXTY-FIVE FOOT TRUCK CROSSING A SINGLE SET OF TRACKS AT 90°; FLAT TERRAIN. ADJUSTMENTS SHOULD BE MADE FOR: UNUSUAL VEHICLE LENGTHS, ACCELERATION CAPABILITIES, MULTIPLE TRACKS, SKEWED CROSSINGS, AND GRADES.

"dhs" and "dhm", WILL BE MEASURED FROM NEAREST RAIL. "dts" and "dtm", WILL BE MEASURED FROM THE NEAREST EDGE OF HIGHWAY.



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APPENDIX B

Changes in Level of Protection

Revised September 1, 1988

Existing traffic control device	Calculated Accident Prediction Value (APV)	Recommended Action for Improvement
Passive	0.08 to 0.12	* See note below. Flashing lights. Flashing lights or gates and flashing lights. Gates and flashing lights. Gates and flashing lights or grade separation. Grade separation.
	0.12 to 0.15	
	0.15 to 0.23	
	0.23 to 12.4 12.4 to 18.5	
	Greater than 18.5	
Flashing lights	0.12 to 0.18	* See note below. Gate and flashing lights. Gates and flashing lights or grade separation. Grade separation.
	0.18 to 3.7	
	3.7 to 5.6	
	Greater than 5.6	
Gates	1.32 to 1.98	* See note below. Grade separation.
	Greater than 1.98	

Reference Alaska Traffic Manual, Table VIII-1 Quantitative Procedure

* NOTE - When the calculated hazard index falls within this range the decision may be to do nothing, improve the existing traffic control system, install a different type of traffic control system, or make some other improvement at the crossing.