TRUCK WEIGHT MONITORING PLAN
USING WEIGH-IN-MOTION DEVICES:
PLAN FOR WIM FOR THE STATE OF ALASKA[1]

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ABSTRACT

Weigh-in-motion (WIM) devices, which measure truck weights and axle configuration at highway speeds, are an integral part of the program to provide highway-use data. WIM devices are also specified in U.S. Code CFR23 as one way of satisfying the mandatory requirement for secondary weight enforcement. Truck weight data also provides valuable information to the highway engineer regarding highway design and pavement management. Alaska, with less than 650,000 people, with only 6870 miles of state highway (2105 mile on National Highway System) and no through-truck traffic from other states place the state in a vastly different truck-weight and highway situation than most other states. Alaska's severe climatic conditions and preponderance of perma-frost further exacerbate the situation.

The objective in the Alaska WIM program is to make sure that every WIM site is merited and appropriately covers the state's truck traffic patterns geographically. In addition to traffic monitoring for the level of truck traffic found in Alaska, WIM sites provide either secondary weight enforcement (5 sites) or data in support of Alaska's Pavement Management System (4 sites) and FHWA's LTPP Program (4 sites). Under this concept the plan calling for 13 WIM sites in Alaska, nine rural and four urban should give the truck loads in (ESAL's) at a 90%-10% level of accuracy (data points are within 10% of their actual value, 90% of the time) at most sites. This is based on processing 1995 and 1996 WIM data from nine existing WIM sites.

In addition, three of the urban sites have the potential, if needed, of providing added data for evaluation of some of Anchorage's future air quality mitigation strategies.

INTRODUCTION

Weigh-in-motion (WIM) devices have been developed for weighing trucks with varying axle configurations at highway speeds. WIM devices are to be an integral part of each state's program to provide highway-use data[3] required by the Federal Highway Administration (FHWA). Further, WIM devices are noted in the U.S. Code (CFR23.657) as one device that satisfies the mandatory requirement for each state to include secondary weight enforcement in its Truck Size and Weight Program. Truck weight data also provides valuable information to the highway engineer regarding highway design and pavement management. In air quality non-attainment areas with particulate pollution, information on truck weight may be important in designing alternative mitigation measures.

This comprehensive plan delineates the future pattern for WIM devices to be used in responding to Federal requirements as well as meeting the needs of Alaska. The main goals for the plan in Alaska are**:**

1. **Achieve an adequate level of weight enforcement to meet Federal standards,**
2. **Meet a level of traffic monitoring reporting appropriate for the level of truck traffic in Alaska,**
3. **Provide data to the Alaska's Pavement Management System,**
4. **Protect the C street bridge over Ship Creek (with the highest level of truck traffic in the state) and urban highways in the Anchorage Basin,**
5. **Support FHWA's effort to develop new highway pavement design methodologies, and**
6. **Potentially provide data to support air quality mitigation measures in Anchorage.**

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1. Presented at the North American Travel Monitoring Exhibition and Conference, Charlotte NC May 11-15, 1998 NATMEC '98

2 The work was performed for the Alaska Department of Transportation and Public Facilities by Dr. Whitford while on Sabbatical leave from the School of Civil Engineering at Purdue University (1997-98).

3. The program developed by every state is based on the Highway Performance Monitoring System and Field Monitoring Guide.

In the process of developing this plan, a number of ideas, concepts and issues were explored. The results have formed the essence of several background papers[4] whose aim was to improve understanding of the overall system of truck weight determination and to help grapple with the various aspects of the plan. Three sections are presented here summarizing the information from exploration of such diverse topics as: (1) traffic data and highway performance monitoring, (2) highway pavement structure design and (3) truck weight enforcement. It is information from these that form this integrated plan. The plan is completed with a discussion of WIM Costs and a specific plan for implementation.

BACKGROUND

At present Alaska has 9 operating WIM sites (down from an original 15). Some of those, presently generating data, are in need of refurbishment, new sensors equipment or need to be moved because of poor site location. No WIM devices are presently used in support of the Truck Weight Enforcement program. Originally the WIM sites were established to respond to Traffic Monitoring System requirements of the FHWA. Later five sites were developed or expanded to provide support to the national effort by the FHWA and Transportation Research Board's research efforts into the performance of highway pavement structures.[5] Over the last several years, Alaska DOT personnel have gained invaluable experience for the implementation of this plan by testing, operating and maintaining WIM devices, from several vendors, in Alaska's cold climatic conditions. Thus, staff competence exists to technically oversee contractors that will be hired to install and maintain WIM devices. This, as well as the in-house capability to reduce and analyze WIM data, will benefit the plan outlined. Likewise, during the last decade WIM technology has also undergone considerable improvement, offering improved reliability as well as better methods for handling and reducing the data.

One major reason for this planning effort was to respond to the requirements in FHWA's Traffic Monitoring Guide for states to have measurements from at least 30 WIM sites each year for truck weight sampling.

> *"The truck weight sample consists of 90 measurements taken over a 3-year cycle with 1/3 of the sample concentrated on the interstate system."* (Traffic Monitoring Guide, page 5-2-2)

> *"The guidelines are presented as minimum specifications which can be expanded and supplemented to any degree desired by the States...Great emphasis has been placed on the use of portable automatic equipment as the most effective and cost efficient means of achieving statistical validity."* (Traffic Monitoring Guide, Page 2-6-1)

Since the monitoring guide was written, portable traffic counting and classification devices have shown that they perform well and give satisfactory data. However, portable Weigh-in-Motion (WIM) devices have not proven to be nearly as reliable and useful as appropriate for a national effort of truck weight determination should demand. When located properly, with good site preparation, permanently placed WIM devices such as piezoelectric cables, bending plates and load cells offer reliable and reasonably accurate weight information.

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4. One of those by Walters and Whitford entitled; *"Strategy for handling the Statistics of truck Weight Data in Alaska"* is presented in another session at this meeting.
5. The program started by the Transportation Research Board in known as the Long Term Pavement Performance (LTPP) Program administered by the Federal Highway Administration.

The number of samples needed to provide the desired accuracy depends on the coefficient of variance for the weight of individual classes (types) of trucks. But the low level of truck traffic and high coefficient of variation have caused the sample size to be high even for a much reduced accuracy of determination. Thus the crucial question to be answered is "Why is the weight distribution of each class of truck needed?" From the perspective of Alaska, as well as nationally, what is really needed, is weight data, in real-time, sufficient to sort out the trucks that need further weighing on a precise scale, as part of the weight enforcement program and to provide data for highway pavement structure design and evaluation. Thus, the analysis, herein, uses the statistics of the truck axle load characteristics of the truck fleet not the individual truck classification as the metric of importance.

RESULTS

Under the concept of average ESAL's per truck over the entire truck fleet an adequate level of statistics would call for 13 sites in Alaska, nine on major rural arterials and interstates and four in the urban area. These are shown in Figure 1 and presented in Table 1. The urban sites are all in Anchorage including one to protect the city access bridge from the Port of Anchorage. The main purpose[6] of the urban sites is to gather data in support of HPMS and to understand the urban truck traffic better. Thirteen (13) permanent WIM sites should provide highway stress data in terms of Equivalent Single Axle Loads per truck (class 5 through 13) at a 90%-15% level of accuracy (data points are within 15% of their actual value 90% of the time) each year and would give a 90%-10% level with two years of data. Since what is important are the cumulative truckloads, used mostly for highway design, this level of accuracy is very adequate for the Alaska WIM plan.

The Traffic Monitoring Guide calls for states to have an accuracy of 95%-10% for the traffic volume and classification portions of the traffic program. The guide lowers this to 90%-10% for the truck weight program. However, more significant than truck weight is the design stress from trucks transmitted directly from the truck tires to the highway pavement structure. In a state with less than 650,000 people, no road connections with other states and 6870 miles of state highways, the truck weight needs in Alaska are vastly different from those of most states. This fact alone merits an individualized program for truck traffic monitoring. With the very much lower level of truck traffic when compared to almost any state in the lower 48, accuracy consistent with the needs of the state's pavement design method is all that is required.

An error analysis of the variables generally used for highway design has indicated that the ESAL's need to be determined to a coefficient of variation in the range of 50 to 70 percent.[7] This translates to a coefficient of variation of about 14 percent for weight measurement and data reduction. This level is achieved by all three available WIM technologies, when the equipment is reasonably calibrated, corrected for temperature variations and maintained including the errors from segregating the data for data reduction.

6. There is a potential that the traffic data gathered might support analysis of future air quality mitigation strategies in Anchorage. (The contention is that loaded trucks pollute differently than empty ones, otherwise classification data would be all that is needed.).

7. Walters and Whitford, op.cit.

Figure 1. Statewide map showing the proposed WIM sites and State Highways

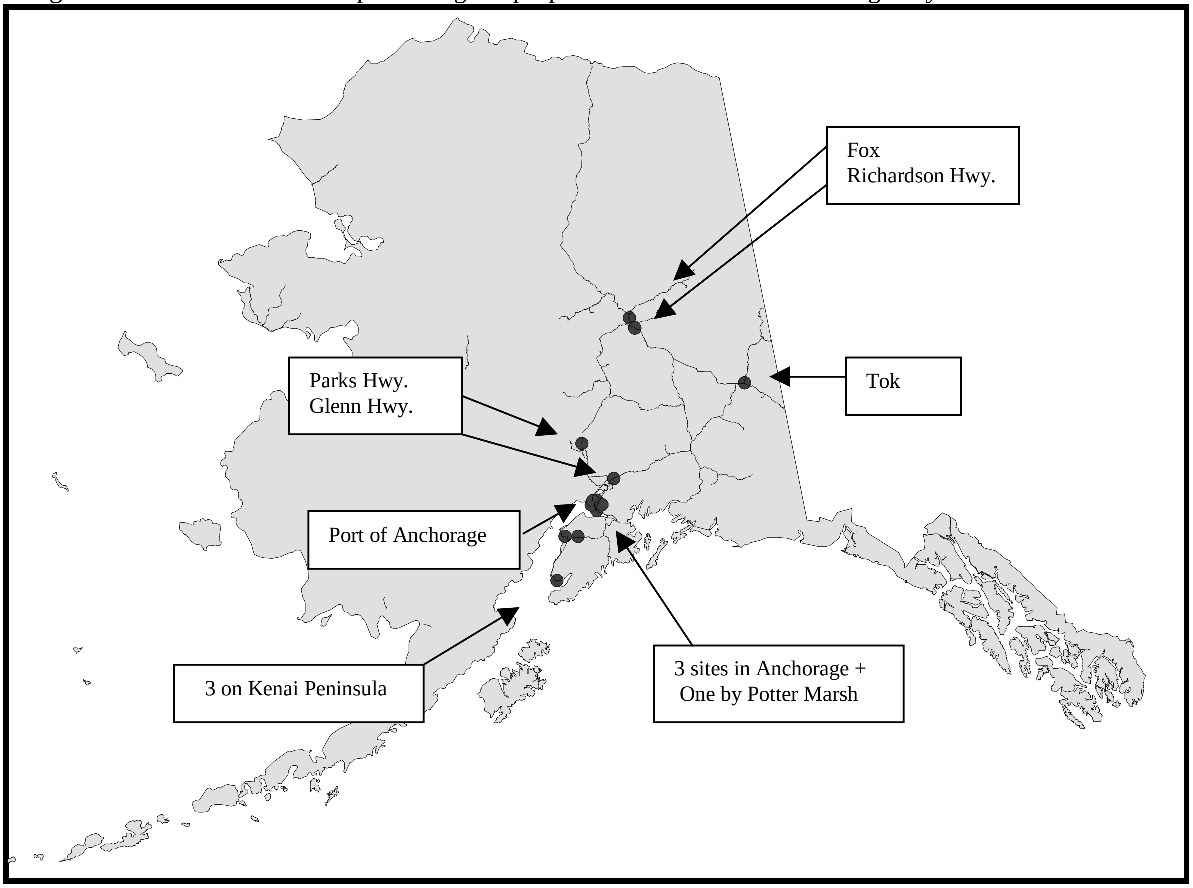

Figure 2 Compares the area of Alaska with the Road system of Alaska to that of the United States

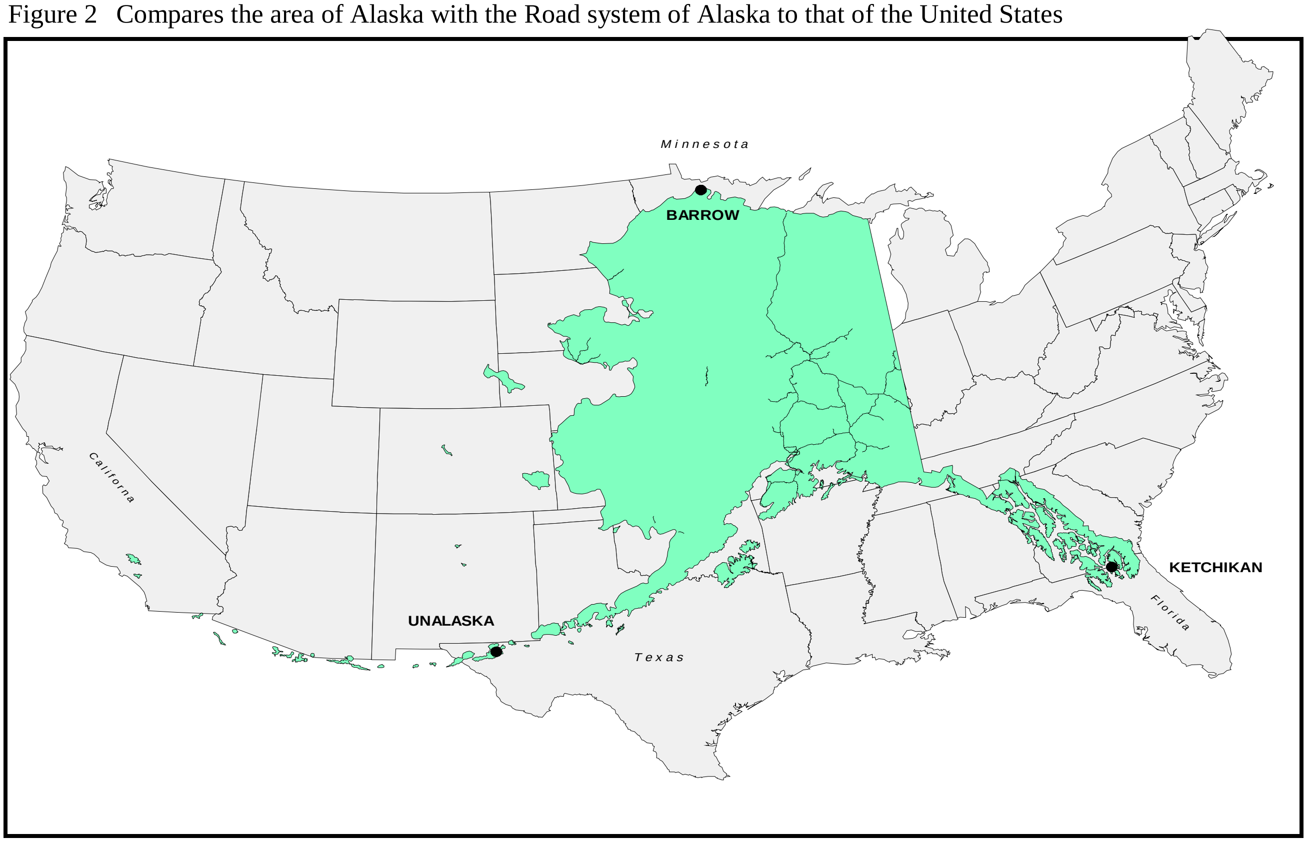

TABLE 1. WIM Plan for Alaska DOT&PF

IM ite	Status FHWA #	Location	Type	Hwy. Class/ Lanes	Action	Date	Cost of Equipment Installed	Data uses	Prior-ity
1	New	Port of Anchorage Bridge	Urban	16/2	Install	1998	$350,000	WE & BMS & HPMS/TMS	1A
2	Existing/103	Tudor/Muldoon Rd (SHRP Site)	Urban	14/4	Refurbish entire site	1998	$350,000	LTPP/NAAQS & HPMS/TMS	2A
3	New location for Site 123	Glenn Highway OB@ Weigh Station.	Rural	01/2	Decommission present site Provide Mainline Sort for Glenn Weigh Station: Effectively a new site.	1998 or 1999	$350,000	WE & HPMS/TMS	1B
4	Existing/104	Seward @ Potter Weigh Station (SHRP Site)	Rural	11/2	Upgrade Provide Mainline Sort for Weigh Station	1999	$250,000	WE Safety & HPMS/TMS	1C
5	Existing/126	Minnesota	Urban	14/4	No Data; 7 lane site failed. Move to four lane section.	1999	$500,000	NAAQS & HPMS/TMS	2B
6	Existing/143	New Seward Highway	Urban	01/4	Recommision site and Upgrade entire site	1999	$500,000	NAAQS & HPMS/TMS	2C
7	New Location for site 535	Fox (SHRP Site)	Rural	02/2	Move the site and refurbish equipment	2000	$300,000	LTPP & HPMS/TMS	3
8	Existing/101	Chulitna (SHRP Site)	Rural	01/2	Pavement Rehab	2000	$100,000	LTPP & HPMS/TMS	3
9	New	Richardson Outbound	Rural	01/1	Mainline Sort (one lane)	2000	$250,000	WE & HPMS/TMS	4
.0	New	Tok @ the Weigh Station	Rural	01/1	Mainline sort (one lane)	2000	$350,000	WE & HPMS/TMS	4
1.	Existing/107	Soldotna	Rural	01/2	Bending Plate Replacement	2001	$200,000	PMS & HPMS/TMS	5
.2	Existing/111	Homer Spit	Rural	02/2	Upgrade	2001	$250,000	PMS & HPMS/TMS	5
.3	Existing/127	Kenai Spur	Rural	02/2	Upgrade	2001	$250,000	PMS & HPMS/TMS	5
.4	Existing/114	Kodiak	Urban	16/2	Future Decommission	2002		HPMS/TMS	6
.5	Existing/106	Palmer/ Wasilla Hwy.	Rural	06	Already Decomissioned	1996	[redacted]		
.6	Existing/179	Kenai River Crossing	Rural	06	Already Decommissioned	1997			
.7	Existing/105	Anchor Point	Rural	02	Already Decommissioned	1996			
.8	Existing/184	Eagle River (SHRP site)	Rural	11	Already Decommissioned	1996			

Note: WE = Weight Enforcement; LTPP = Long Term Pavement Program: PMS = Pavement Management System; HPMS/TMS = Highway Performance Monitoring System/Traffic Monitoring Guide

SUMMARY OF INVESTIGATION COMMENTS

Three sections are presented summarizing the information from exploration of the diverse topics of traffic data and highway performance monitoring, highway pavement structure design and truck weight enforcement. It is the data expressed in these areas of investigation that form the basis of this plan.

Traffic Data, HPMS and WIM

Alaska is just not a big player in the truck traffic game and the traffic data is gathered over a state highway system of only 6870 miles (2105 mile on National Highway System). The map of Figure 2 as an Alaska overlay on the continental U. S. The U. S. road system under the area of map has approximately 40 times the mileage of the Alaska system.

1. The Alaska highways have at least an order of magnitude less truck traffic than highways in many other states. This is due to the small relative population and no through truck traffic. The comparison of daily truck traffic at Alaska's two busiest WIM sites and two of Indiana's is shown in the table below illustrates the point and a 30:1 truck ratio.

Table 2 Comparison of Truck Traffic on Alaska Interstates with Two Indiana Interstates

	Location	Class	Dir.	Lanes	AADT Directional	Daily Trucks Class 6 - 13
Alaska	Richardson outbound	Rural	EB	2	10,755	226
	Glenn outbound	Urban	EB	2	9,031	201
Indiana	I 70, I 465 to - Ohio Border	Rural	EB	2	25,167	6,512
	I 465 Indianapolis	Urban	SB	4	87,340	8,111

2. Coverage of the state with traffic count data under the Highway Performance Monitoring System (HPMS) and the Traffic Monitoring Guide is very adequate even with many less than the 100 classification counts suggested by the Traffic Monitoring Guidelines.

3. The Traffic Monitoring Guide speaks to the possibility of flexibility in setting up the HPMS program:

   "For states with very limited roadway extent, the 30 measurements could be taken at less than 30 locations. For example, if a state has 100 kilometers of Interstate, it would be ridiculous to sample at 30 different points in a 3-year cycle. Alternatives would be to annually take two measurements scheduled at different times of the year at five different locations or five annual measurements at two locations. Under the first alternative the 5 monitoring sites would be fixed at five sites. Under the second alternative, two different locations would be sampled each year of the three-year cycle resulting in 30 measurements at six sites. Data analysis would be carried out to determine if a smaller sample was statistically justified given the special circumstances.

   "It should be clear from the discussion that judgment is needed. The truck weight sample has been designed to provide maximum flexibility to ensure adequate application given varied circumstances. It is appropriate, however, to caution that flexibility may well result in the introduction of bias and error. Care should be exercised when applying these procedures to ensure that statistical objectives are maintained... (TMG pp.-2-6 &7*)*

4. HPMS includes an active vehicle classification data program. Estimates of axle loads can be obtained for any highway through the "Truck ESAL" model given in Equation 1 below using classification data. Because of short (16 hour) counts in summer only in the Northern region (Fairbanks area) two permanent classification sites are recommended to be added in that region.

ESAL's = 0.072 x Single Axle Crossings + 0.45 x Tandem Axles Crossings Equation 1

5. Existing truck fleet data (1995 and 1996) show a reasonably low coefficient of variation (0.25 urban and 0.45 rural) in the average ESAL's per truck even using small sample statistics. This led to the initial 13-site plan, if 90% -15% data reliability is used for one year of data. With two year of data, 90%-10% is possible.

6. The WIM portion of the HPMS program seems to be of lower importance in the Traffic Monitoring Program, assuming the state can show that it is adequately addressing the truck weight issues for road design. HPMS is most concerned with highway physical data and data collected to determine average annual daily traffic (AADT), highway capacity and use, congestion and community development. Therefore, truck data appears to be secondary for the program's stated purposes.

7. The major statistical accuracy consideration is for Equivalent Single Axle Loads (ESAL's) from truck fleet is related to the needs of highway design.

Highway Pavement Design

The Alaskan climate provides the basis for a significant difference in pavement structure design procedures compared to those used by many states

1. The design procedures for pavement structure in Alaska are unique. Adherence to them provides adequate strength to withstand the anticipated light truckloads. Important to the design procedure is control of the base and subbase materials. In particular the limits on the level of granular fines to a depth of one meter below the asphalt surface course is significant in developing non-frost susceptible pavement.

2. Most Alaska highways are designed to be non-frost susceptible and appear to have adequate strength to withstand anticipated growth in truck weight carriage of about 3% per year. This corresponds to the conservative estimate of 18 to 25% per year growth in axle loads or stress on the highway. Those segments that are frost susceptible are the subject of continued study. This is especially true where the perma-frost occupies a position close to the surface.

3. Alaska Highway pavement structures when analyzed using the AASHTO design guidelines and equation appear very, very conservative. This may be another indication of the weaknesses in the AASHTO guidelines as indicated by recent research by the Transportation Research Board.

4. The present WIM program in Alaska has 4 active sites (covering traffic on five segments of highway) that are providing highway performance data for the national Long Term Pavement Program (LTPP) sponsored by FHWA. This program is dedicated to developing a better highway pavement design process including understanding low temperature effects. The LTPP program is in its ninth year of a twenty-year plan.

5. Highway distress, known as rutting, is a particular problem throughout Alaska. Its cause is not well understood and is apparently due to some combination of wear from studded tires, the pavement materials used, and the interaction of the thin (5 centimeter thick) asphalt pavement with the stone base course.

Truck Weight Enforcement

Certification by FHWA, under U.S. Code CFR 23.657 requires secondary enforcement devices be employed as an integral part of the enforcement program. Non-attainment of certification means FHWA may withhold a portion of a state's highway funds.

1. The Alaska truck weight and size program seems barely adequate to achieve certification in its present mode of using portable weighing devices for secondary enforcement.
2. WIM devices are considered as one adequate means to meet the secondary enforcement requirement when used directly in conjunction with a weigh station. The principal approach for the lighter traffic loads experienced in Alaska will be to use the WIM as a mainline sorter. This is where trucks that are close to the weight limit will be signaled to enter the scales, while all other trucks will be told to continue on the highway without entering the scales.
3. There are ten weigh stations (static scales) strategically placed to cover most of the heavy truck traffic.
4. From the 24 hour data obtained by WIM, useful information could be provided periodically to scale-house management to assess operating hours of a weigh station and for the assignment of personnel.
5. The one location that desperately needs a weigh station is the access road leading from the Port of Anchorage to the City of Anchorage. This access road consists mostly of a one-half mile viaduct/bridge over the Ship Creek and the railroad yard.
6. This bridge carries the heaviest level of truck traffic of any highway in the state. This is due to Alaska's unique geography when combined with the fact about 50% of the state's population lives in the Anchorage area. With the winter climate isolating many other ports and rivers, it is also the main port serving about 90% of the state. Most goods that enter the state, come in containers that arrive by water and most of those come into the Port of Anchorage. Almost 100,000 containers arrive at the Port of Anchorage annually. Over 65% of these have an initial destination within the Anchorage basin.
7. It has been noted that as many as 35% of the containers coming into ports in the lower-48 from overseas become part of an overweight truck when placed on the usual truck chassis for transport over the road.
8. Overweight trucks create significantly increased structural stress on bridges. The protection of the Ship Creek Bridge demands that overweight trucks be kept off the bridge. At present, if the driver of an overweight truck, scheduled to leave the port, request an overweight permit, the driver is required to avoid the bridge. This 'detour' entails taking a very circuitous route into Anchorage.
9. As an initial step, a WIM site at the entrance to the bridge should be used to determine the level of overweight traffic with potential enforcement procedures to follow.

WIM COSTS AND BENEFITS

The WIM technologies are now proven and available depending on the accuracy desired. Alaska's main experience has been with the piezoelectric cables and the bending plate sensors. The bending plate sensors seem to work better and last longer with more reproducible results in the Alaska climate. Table 3 presents an estimate of the twelve-year present value (NPV) of the costs per lane for each sensor type with 5% and 10%

discount rates. Bending plate and load cell sensors do not last more than 6 years, so the costs include refurbishing the sensors at each site at the end of 6 years as well as annual inspection and usual periodic maintenance costs. The less expensive piezoelectric sensors do not stand-up well in Alaska and will need replacement every three to four years. All stations include a 100 to 200 foot long concrete pad that improves the longevity and accuracy of the sensing equipment.

TABLE 3. Net Present Value of Sensor Equipment (Installed)

System Sensor	Accuracy Est as 2σ	Net Present Value 12 years	
		5%	10%
Piezoelectric Cables	±10%	$71,000 per lane	$58,000 per lane
Bending Plate	±5%	$81,000 per lane	$67,000 per lane
Load Cell	±3%	$105,000 per lane	$95,000 per lane

Source: Calculated from base data from IRD

The in-house Alaska costs of site design, specification preparation, procurement, contractor oversight and data reduction are not included. Other costs like traffic control required during installation and regular scheduled calibration are, also, not included. Alaska has the staff with demonstrated expertise to work with the WIM technology having identified and solved a number of equipment problems, some related to the Alaska climate and others to the foibles of the equipment.

The benefit of the program is that its implementation gives clarity for meeting the needs of Federal certification of Alaska's weight enforcement program as well as the federally mandated HPMS program. Other benefits include:

- increased efficiency for truckers because of fewer stops at some weigh stations,
- improved utilization of truck weigh station operation,
- increased safety from reduced truck exit/entry on highways,
- improved data for Alaska's Pavement Management System,
- continued participation in the important highway pavement research program (LTPP),

Avoiding a potential for loss of highway funds from lack of certification of the weight enforcement program is not met. Even one year's loss of 5% of the state highway funds is beneficial enough to engage in program of this magnitude.

The funds to accomplish the project implementation are presented in the, FHWA approved, Alaska's *Statewide Transportation Improvement Program for the Federal Fiscal Years 1998-2000*. (STIP) The project indications are summarized in Table 4. The embedded projects include the WIM sites on the outbound Glenn Highway at the weigh station, the Port of Anchorage access road, Minnesota Drive and the Port of Entry Weigh Station at Tok. The other nine projects are listed as a separate WIM entry.

Table 4. WIM Projects in the STIP

	WIM Sites (13)		
Year	Separate Sites	Project Embedded	Total Cost for WIM
1998	**1**	**0**	**$230K**
1999	**2**	**2**	**$2,252K**
2000	**4**	**0**	**$1,615K**
2001	**2**	**2**	**$1,282K**
TOTAL	**9**	**4**	**$5,379K**

Source: Alaska DOT/PF *Statewide Transportation Improvement Program for the Federal Fiscal Years 1998-2000*

PRIORITIES FOR IMPLEMENTATION

Table 1 shows the detail site changes and the general approach for implementation. The dates for the individual site projects are chosen to minimize the necessary resources, especially in the early design phase. For example, the first two years are all projects within the Anchorage basin. Likewise the attempt is made so that new sites or relocated existing sites will serve more than one purpose.

Priority 1 Put WIM in as the secondary weight enforcement method for three critical sites:

1A *Port of Anchorage:* Develop a WIM site leading to and from the Port. (Note as the rail grade crossings are removed in 1999, WIM equipment can be installed for the least cost. WIM should be part of the engineering design now being done for this project.) Installation of WIM will allow DOT to obtain one to two years of data to see if added weight enforcement measures are necessary. This is critical since the Port of Anchorage is the main entry for freight and in other states, trucks carrying containers from the port have shown a propensity to be overweight. The structural integrity of the bridge is at stake and Alaska's Bridge Management system will benefit.

1B *Glenn Weigh Station*: Place a WIM site on the mainline of the Outbound Glenn Highway to work with the Weigh Station and as mainline sort system. This weigh station sees the largest number of trucks. The system would notify only those trucks close to the weight limit to enter the scales. Other trucks could pass by without the need to stop and be weighed.

1C *Potter Marsh*: Add a sort notification system to the Potter Marsh weigh station for southbound traffic. Southbound traffic must turn left into the station, crossing northbound lanes and traffic. This is a safety hazard. By weighing only those trucks close to weight limit a large number of lane-crossings can be avoided. Due to the terrain at the weigh station, it is likely that the WIM cannot be as close to the Weigh Station as one would like. Special signing and communications will have to account for the longer than usual distance.

Priority 2 Outfit the three Urban sites as an adjunct data provider for evaluating trucks' contribution to air quality. Three sites where the truck traffic is especially high are identified. Heavily traveled thoroughfares of Tudor Rd, New Seward Highway, and Minnesota Ave are targeted for either WIM upgrades or moves. Permanent classification stations at another five locations in the Anchorage already exist to provide a good picture of the truck traffic

Priority 3 The four WIM sites being used to gather data in support of 5 pavement sections for the Long Term Pavement Program (Table 1 sites numbered 2, 4, 7 and 8) should be kept up, upgraded to Bending plate WIM sensors, be repaved, or in the case of the site at Fox moved to a better stretch of road. When the latter is done, it may behoove the department to examine the usability of a WIM in this location as a sort system for the Fox weigh station, which services traffic coming from three directions.

Priority 4 Continue the expansion of the secondary Weight Enforcement by placing one lane WIM sites on the Richardson Outbound and TOK weigh stations. Because of the cold climate conditions, these sites may take some special design.

Priority 5 Working with the PMS and DOT's test and materials personnel, the adequacy of the three sites on the Kenai Peninsula should provide added data on frost susceptibility. The advantage of these locations will be assessed early in the program and, if necessary, they will be moved. These sites are appropriate to round out the coverage of roads and traffic volumes for the FHWA's Traffic Monitoring Guide.

Priority 6 Decommission the site at Kodiak as soon as it fails.

SUMMARY

In summary the WIM plan has addressed the key issues for integrated truck weight program for Alaska and makes the following points:

- 13 Sites are needed to meet FHWA guidelines
- Provides needed level of secondary weight enforcement with 5 weigh stations
- Reduces weigh station congestion & lost trucker time.
- Protects pavement and the long port access bridge
- Contractors have capability to maintain DOT staff at existing level
- Continues relationship with FHWA on important LTPP
- Supports the Pavement Management System & Highway Design with improved knowledge of Pavement/Truck Interaction
- Funding has been made available through the approved STIP

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