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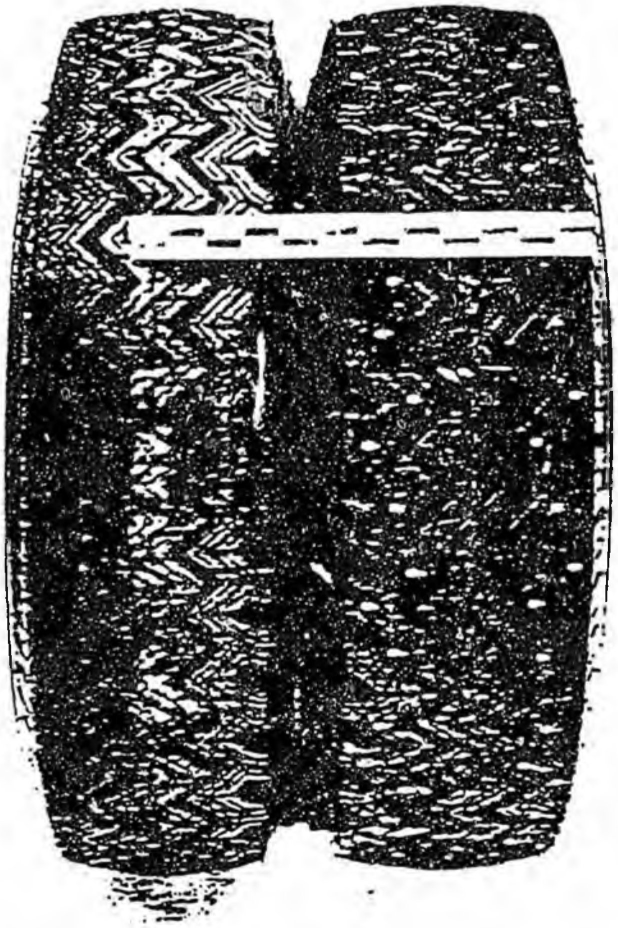


Figure 2.1. G78x14 studded (R) and unstudded passenger tires (Krukar & Cook, 1972).

Table 2.3. Typical cross-sectional area specifications (NCHRP Syn. 32).

Nominal Car Size	Tire Data		Tire Stud Data		
	Nominal Size	Typical Tread Surface Area (sq. in.)	Typical Maximum Number of Studs	Typical Cross-Sectional Area (sq. in.)	Percent of Tread Surface Area
Compact	B78x13	250	96	.0314	1.25
Intermediate	F78x14	270	96	.0314	1.10
Full Size	H78x15	312	96	.0314	1.00

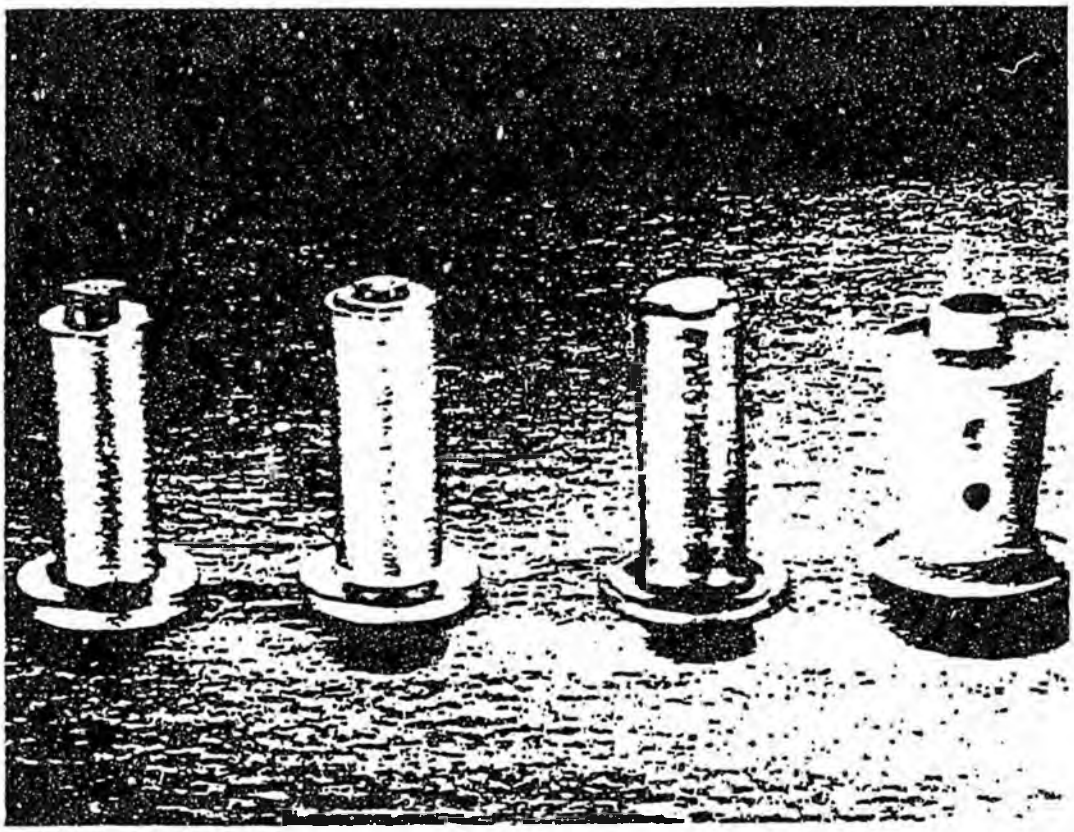


Figure 2.2 Four basic stud types. Left to right: Type III or CV Stud; Type I or CP Stud; Type II or PT Stud; and Type IV or FS Stud (Krukar & Cook, 1973).

Table 2.4. Characteristics of studs (Krukar & Cook, 1972).

Stud Type	Characteristics
Type I - "Controlled Protrusion Stud"	• Carbide pin will move further into stud body if protrusion limit is exceeded • 18% lighter in weight than conventional stud • 5% smaller flange than conventional stud
Type II - "Perma-T-Gripper Stud"	• Pin found in other studs has been replaced with relatively small tungsten carbide chips in a soft bonding matrix enclosed in a steel jacket • Designed to wear within 10% of tire wear, thus maintaining a protrusion of approximately 0.020 in. or less
Type III - "Conventional Stud"	• Tungsten carbide pin • Stud protrusion will increase with tire wear
Type IV - "Finnstop Stud"	• Complete stud of light plastic casing with a tungsten carbide pin • Stud can be adjusted close to the tread rubber eliminating oscillation of the stud • Pin angle contact with road varies little with speed • Plastic housing tends to reduce effect of centrifugal force and heat build-up between rubber and stud • Air cushion can be left under stud to reduce stiffness (floating stud)

wear, the tungsten carbide pin is pushed deeper into the stud housing providing a uniform protrusion length throughout the life of the stud. This benefit is not fully realized with the other stud types since the protrusion length of the stud can vary over time. Figure 2.3 gives the dimensions for the Controlled Protrusion Stud (see Appendix C for further details), while Figure 2.4 illustrates a fifth type of stud which was listed in the literature as being considered for manufacture. The number of studs/tire range from 64 to 120 (see Table D1).

In Sweden, it has been long recognized that the conventional studs cause excessive tire wear. They have therefore developed a new low-noise, reduced road wear ice-stud. It weighs only 0.7 gram, yet reportedly retains ice grip and durability. The reduction in weight is possible due to the use of a new polymer in the stud body (Simonsson, 1990).

2.4 Permitted Use Periods

Based on the results of the literature review the periods of the year to which studded tire use is restricted in the United State and Canadian Provinces is shown in Figure 2.5 (TRB, 1975). Note that in the 1970's 14 states and two provinces had no restrictions and that nine states and one province prohibited the use of studded tires. The remaining states and provinces allow use of studded tires only during the fall, winter, and spring months. The results of the 1990 survey (Table 2.5) showed, for North America, that only three agencies had no restrictions, 25 states/provinces restrict stud use to a given time period, and eight agencies prohibit their use. For those agencies restricting the use of studs to a specific time period, most restrict their use to the period from October through April. Similar results for the European countries surveyed are given in Table 2.6.

2.5 Enforcement

The results of the survey (see Appendix B, Question 7) also investigated the role of enforcement during prohibited periods. Generally, the risk of getting caught is considered low to moderate. Only South Dakota, Washington, Illinois, Minnesota, Nevada, Ontario, and Quebec indicated a high risk. The cost of being cited also varies considerably, with ranges in fines from <$25 to $500 plus vehicle impoundment.

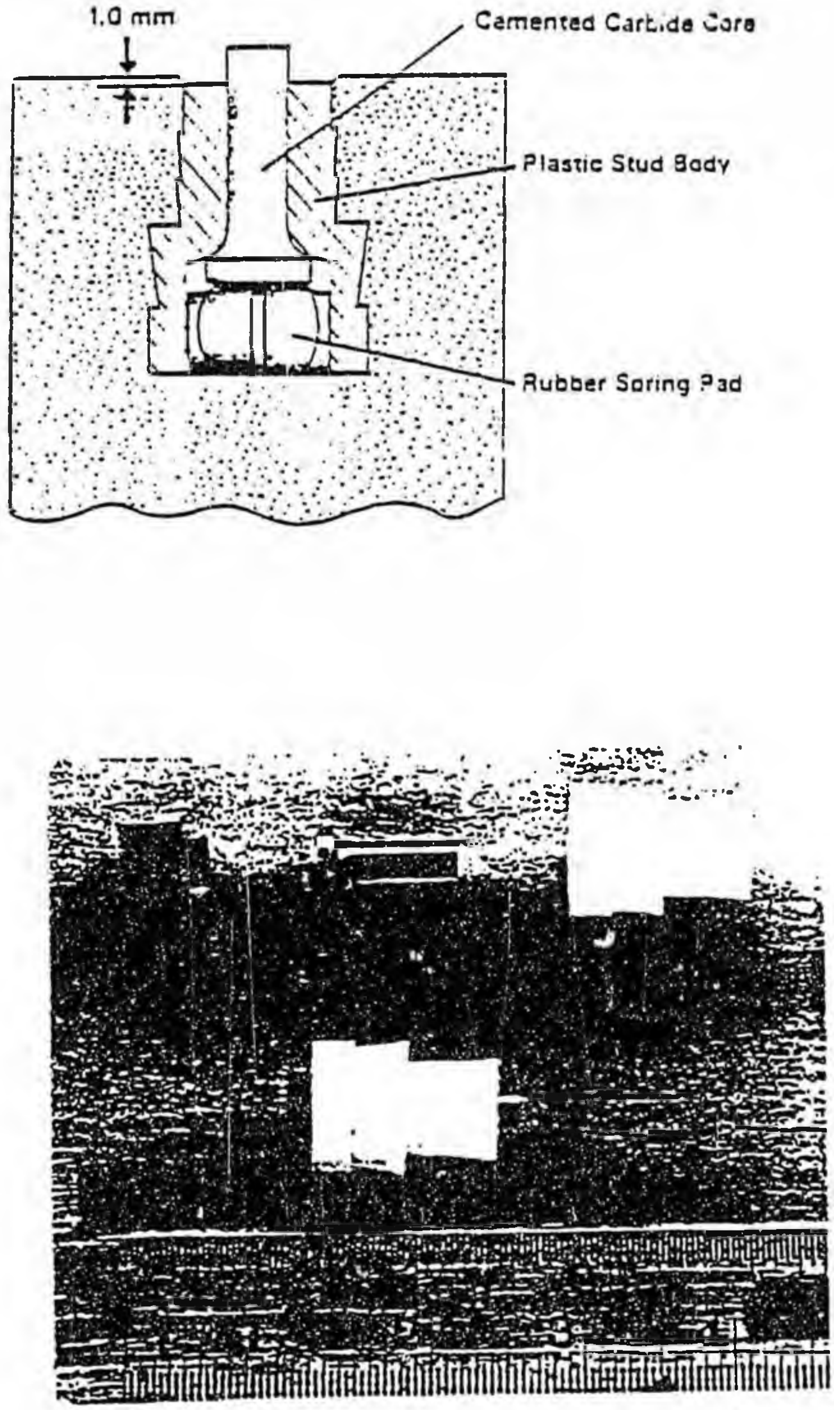
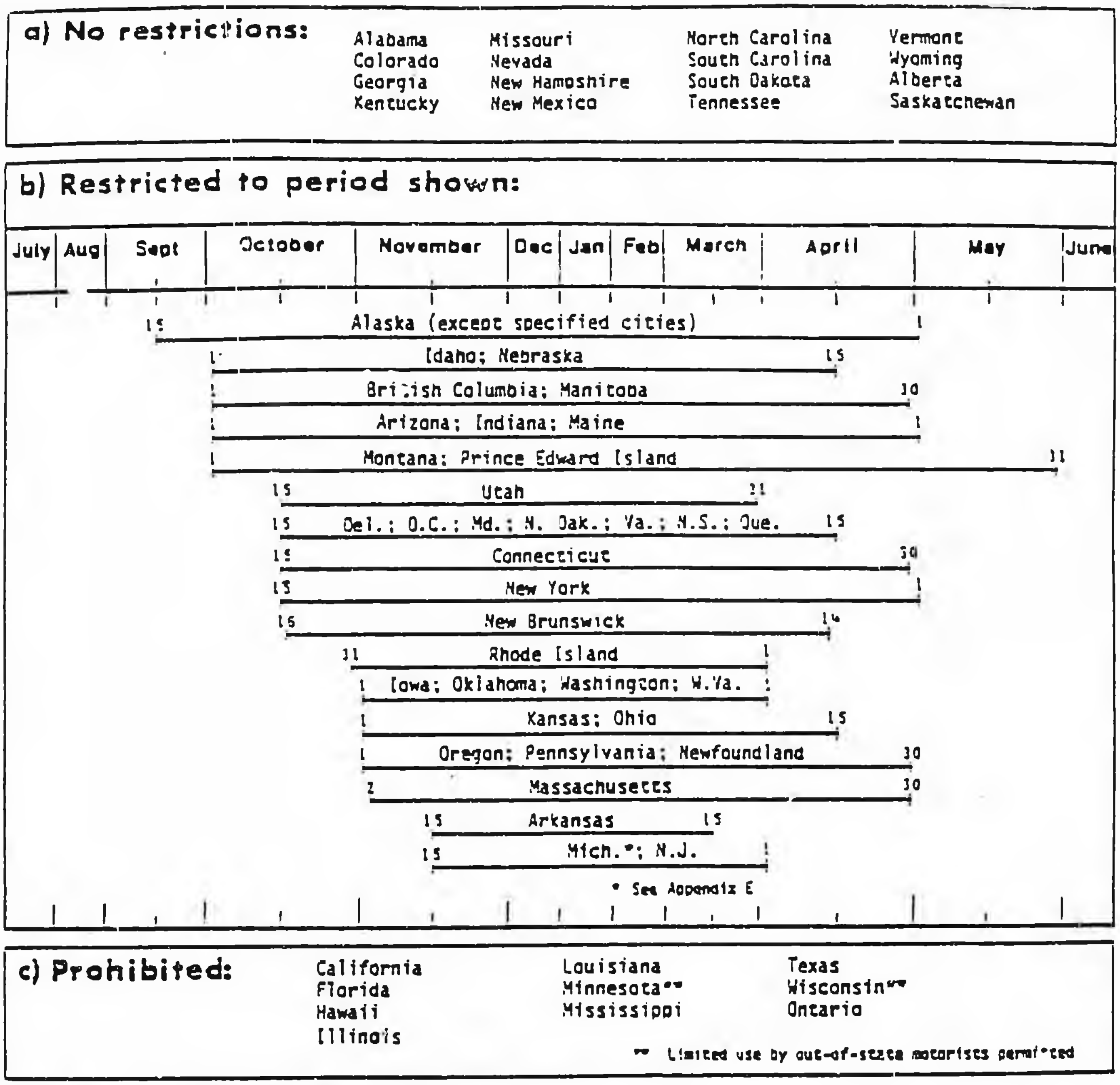


Figure 2.4. Spring-action stud (Fagersta Steels Limited) (NCHRP Syn. 32).



Sources: American Automobile Association 12-1-74
Federal Highway Administration June 1975

Figure 2.5. Legal restrictions on use of studded tires (NCHRP Syn. 32).

Table 2.5. Restrictions on use of studded tires in the U.S./Canada (August 1990).

a) No restrictions	Colorado Vermont Saskatchewan	
b) Restricted to time period shown	Alaska	Sept. 15 - April 30 (north of latitude 60°N) October 1 - April 14 (south of latitude 60°N)
	Connecticut	November 15 - April 30
	Iowa	November 1 - April 1
	Kansas	November 1 - April 5
	Maine	October 1 - May 1
	Nevada	October 1 - April 30th
	New Jersey	November 1 - April 1
	New York	October 15 - May 1
	Rhode Island	November 15 - April 1
	Utah	October 15 - March 15
c) Restricted (period unreported)	California Delaware Idaho Indiana Montana Nebraska North Dakota Oregon Pennsylvania South Dakota Washington Wyoming New Brunswick Nova Scotia Quebec	
d) Prohibited	Arizona Illinois Maryland Michigan Minnesota Alberta Northwest Territories Ontario	

Table 2.6. Restrictions on use of studded tires in Scandinavia (August 1990).

a) No restrictions	
b) Restricted	Sweden - 31 October to Easter Finland - 1 November to 31 March
c) Prohibited	Germany

3.0 ROAD WEAR STUDIES

This chapter summarizes, based on the literature, the results of studies from throughout the world to identify the cause (mechanism) of pavement wear owing to studded tires, the rate of pavement wear, and factors which affect the rate.

3.1 Cause of Pavement Wear

The results of the literature review indicated that the mechanism of wear is primarily by abrasive action. Nieme (1978) has summarized the mechanism best, as shown in Table 3.1. Which of the four possible cases is most important is still open to debate. In Alaska, it is generally felt that the primary mechanism of studded tire wear is by scraping off the mastic and abrasion of the aggregate.

3.2 Factors Affecting Wear Rate

Several factors have been identified as affecting the pavement wear rate. Keyser (1970) has prepared (in Table 3.2) an excellent summary of these factors. In addition, Keyser (1972) stated the most important factors to be wheel load, stud protrusion, temperature, and humidity.

Figure 3.1 shows the effect of pavement type on wear rate. The "regular" bituminous pavements consisted of fine-graded mixtures for thin overlays with 85-100 penetration asphalts while the "high type" bituminous pavements contained either rubber or asbestos admixtures and 85-100 asphalts. The "regular" pavements contained a filler while no filler was present in the "high type" pavements. For both tests (on a test track and typical highway pavements), the wear rate was considerably greater for asphalt concrete compared with portland cement concrete pavements. Aggregate type also had an effect for the portland cement concrete pavements. Other factors, as shown in Table 3.3, can also affect the wear rate. In addition, as shown in Figure 3.2, the wear rate in acceleration can be 2 1/2 times the wear rate in deceleration.

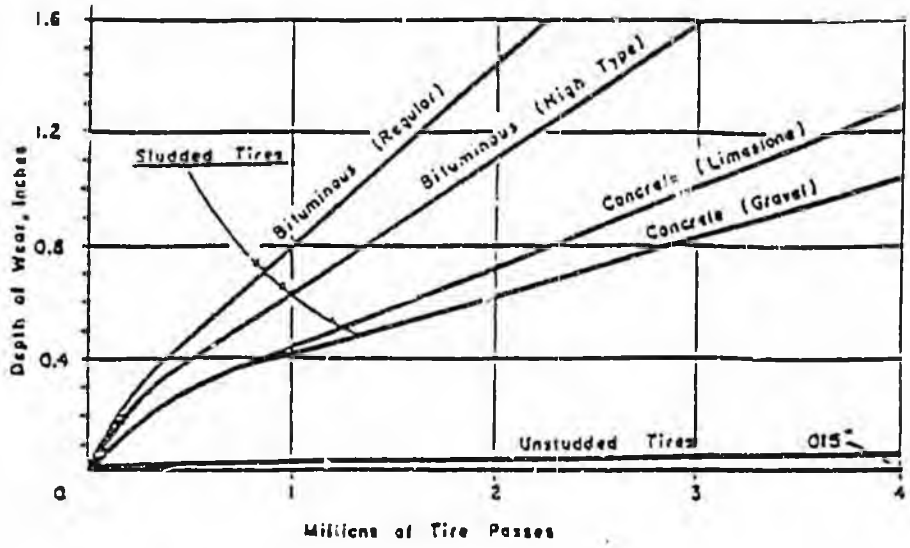
Figure 3.3 shows the effect of stud type on the average rate of wear on a test track under 542,000 wheel passes. In all cases, the wear rate was greatest during the initial 160,000 wheel passes. Wear rates then decreased to only 11 to 31% of the initial rates during the final 220,000 wheel passes. Type I and III studs caused much greater wear than type II studs.

Table 3.1. Cause of pavement wear under studded tires (after Niemi, 1978).

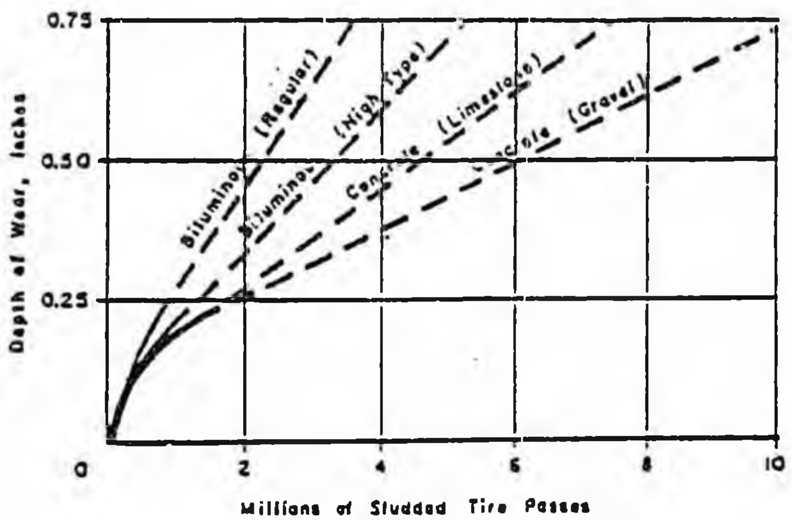
Cause	Description
1	The scraping action of the stud produces marks of wear on the mastic formed by the binder and the fine-grained aggregate.
2	The aggregate works loose from the pavement surface as a result of scraping by studs.
3	Scraping by the stud produces marks of wear on stones. Only in very soft aggregate does a rock fragment wear away completely by this action.
4	A stone is smashed by the impact of a stud and the pieces are loosened by the scraping action of the stud.

Table 3.2. Factors affecting pavement wear (Keyser, HRR 331, 1970).

Factor	Component	Characteristic
Vehicle, tire, and stud	Vehicle	Type and Weight Axle load Number of studded tires (front, rear)
	Tire	Type (snow or regular with or without stud receiving holes) Pneumatic pressure Age Configuration of studs Number of studs
	Stud	Type (material, shape) Protrusion length Orientation of studs with respect to tire wear
	Stud wear vs. tire wear	
Pavement	Geometry	Cornering (curve, sharp turn) Straight section Intersection Slope (up and down)
	Surfacing Material	Type and characteristics (bituminous mixtures, surface treatment, precoated chipping, portland cement, hardness) Age
	Surface Condition	Surface texture and profile Icy Compacted snow (compactness) Sanded or salted icy surface Slush
Environment	Humidity, temperature	Wet, dry, humid
Traffic	Volume	Number of passes and composition
	Speed	
	Wheel track	Width Distribution of wheel load
	Contact mode	Start (normal, abrupt) Stop (normal, abrupt) Acceleration (rate) Deceleration (rate) Spin Skid
Measure	Method and precision	



a) Wear rates of pavement specimens at test track



b) Wear rates of pavements of typical Minnesota highways

Figure 3.1. Relationship of studded tire induced wear vs. pavement type; Minnesota research (Keyser, HRR 352, 1971).

Table 3.3. Effect of Factors on Resistance of Asphalt Pavement to Wear by Studded Tires (Keyser, HRR 352, 1971).

Factors	Influence on Wear	Wear Ratio
Penetration of bitumen[a] 60 vs 300	Significant	1:1.3
Bitumen content[a] 5 vs 7 percent (opt. at 7 percent)	Very significant	1:1.8
Type of aggregate[b] Lamprophyre vs limestone	Very significant	1:1.6
Mix type[b] Special mix vs sheet	Very significant	1:1.8
Voids in mix[a] 3 vs 7 percent	Significant	1:1.4
Uniformity[a] Asphalt concrete variation	Variation	X ± 42 percent
Vehicle Speed[a] 60 to 80 km/hr	Not significant	–
Vehicle Weight[a] Car vs truck	Very significant	1:1.9
Tire pressure[a]	Not significant	–
Temperature[c] 37 ± vs 50 F	Very significant	1:1.5

[a]Data taken from Norwegian studies
[b]Data taken from Keyser's work
[c]Data taken from Finnish studies

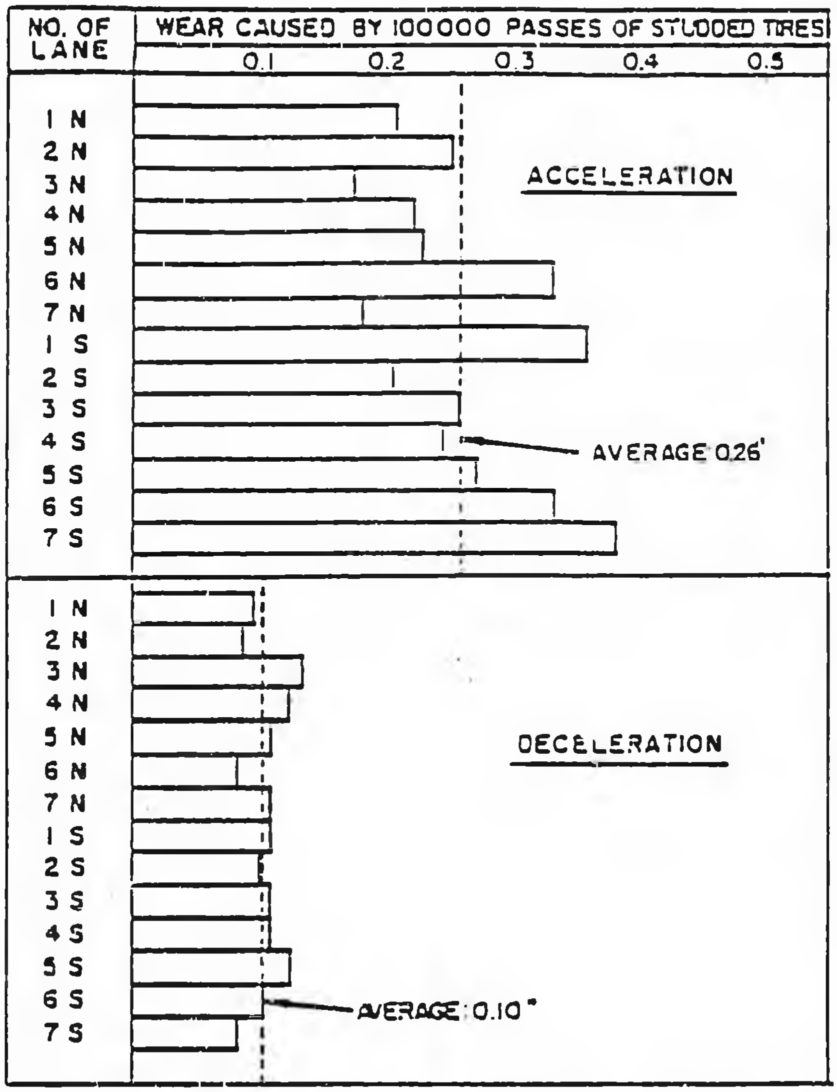
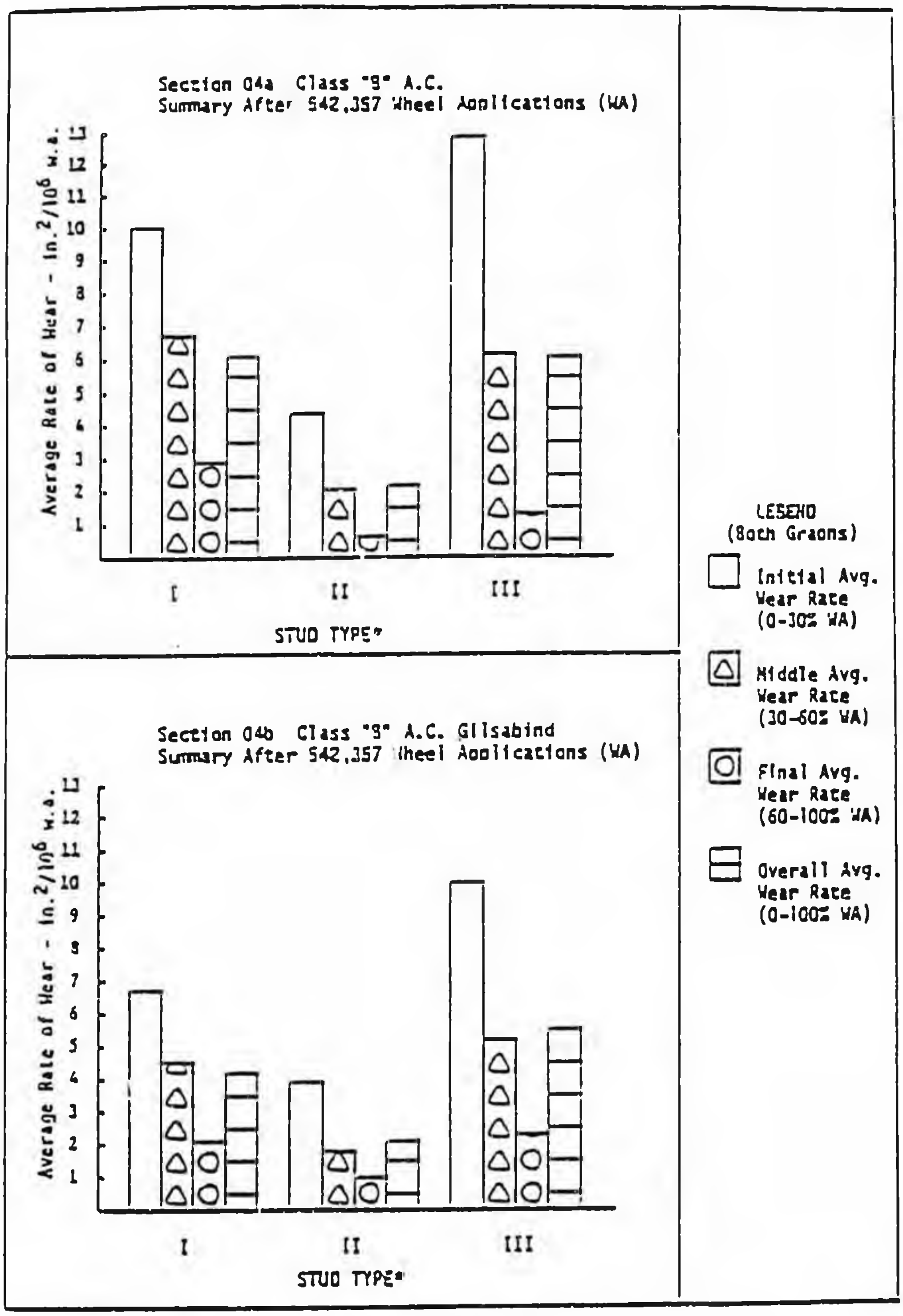


Figure 3.2. Relationship between acceleration and deceleration on portland cement concrete (Keyser, HRR 352, 1971).



* Wear Rate Due to Unstudded Tires Insignificant or Immeasurable.

Figure 3.3. Effect of Stud Type on Wear for Asphalt Concrete Pavements (Krukar and Cook, 1972).

Finally, temperature affects wear rates for asphalt concrete. The work by Krukar and Cook (1973) shows the lowest wear rate at or near 0°C. Increases in pavement wear as pavement temperatures go below 0°C are reportedly associated with increased tire hardness and pavement stiffness. As temperature decreases, pavement stiffness increases, as does the force required to push the stud into the tire so that tire so that it is flush with the pavement surface. Thus, at low temperatures, the combination of high stud force and increased pavement brittleness may result in increased wear rate. However, in Alaska it has been observed that wintertime frost and ice formation on roadways in colder cities such as Fairbanks can provide a protective surface coating and greatly reduce the low temperature wear rates.

The rate of wear reportedly increases when the pavement is wet (Keyser, 1970).

3.3 Pavement Wear Studies

The number of pavement wear studies is quite limited. However, both the literature review and survey did yield some basic information as shown in Table 3.4. In general, these results indicate:

1) Reported wear rates vary considerably between agencies. This likely is due to differences in percentages of vehicles with studded tires, and to materials differences.
2) Pavement type has a great effect on pavement wear. Asphalt surfaces wear at a faster rate than portland cement concrete.
3) In areas of acceleration and deceleration, pavement wear increases substantially.
4) Mixes with larger, more durable aggregates wear less.

In addition, other factors were shown to influence the wear rate. These are given in Table 3.5.

a) Literature

Reference		Rate of Wear (in./passes)	Avg. Rate/ 100,000 passes
Quebec (1967)		0.25/100,000	0.25
Quebec (1970)	Acceleration	0.36-0.44/100,000	0.40
	Deceleration	0.18-0.20/100,000	0.19
	Normal	0.11/100,000	0.11
Germany (19XX)		0.11/120,000	0.09
Finland (1988)		.15-.2/10,000 AADT	
Sweden (Keyser, 1970)		0.5/40,000 AADT	
Maryland		0.28-1.07/100,000	0.7
Minnesota		1.5/4,000,000	0.04
Oregon (ODOT, 1974)	Concrete	0.026/100,000	0.03
	Asphalt	0.066/100,000	0.07

b) Survey

Reference	Rate of Wear (in./passes)	Avg. Rate/ 100,000 passes
California	0.0005-0.0018/1000	0.12
Connecticut	0.08/1,000,000	0.01
Maryland	0.028-0.107/10,000	0.68
New Jersey	0.05 per year for 5400 AADT per lane	
New York	0.009-0.016/year PCC pavements 0.022-0.025/year ACC pavements	
Oregon	0.032/100,000 PCC pavements 0.073/100,000 ACC pavements	.03 .07
Norway	SPS[a]: AC = 25, Topeka = 15, Mastic stone = 10-15, PCC = 10	
Sweden	35 g/vehicle (4 studded tires)/km driven	

[a]SPS = g/cm (specific wear in grams worn out of the surfacing when a car with 4 studded wheels drives a 1 km distance)

Table 3.5. Factors affecting studded tire wear.

Factor	Variable	Comments
Traffic (ADOT)	Normal	Standard wear
	Acceleration	Increases wear rate by 300%
	Deceleration	Increases wear rate by 200%
Surface Type (ADOT)	Bare pavement	Increases wear rate*
	Snow pack	No wear

*Amount not reported.

4.0 IMPACTS OF STUDDED TIRE USE

The impacts of studded tire usage are twofold: 1) increased costs to the agencies through accelerated pavement wear as well as through safety problems created by the wheel track ruts and 2) benefits derived through increased traction during icy conditions which either improve safety or allow increased speeds. The use of studded tires is somewhat dependent on the agency's ice control practices. For example, heavy salt use for a "bare pavement" policy reduces icy road concerns in exchange for increased vehicle and bridge corrosion effects. This section of the report discusses each of these impacts, and is based on the results of the literature review and of the survey of agencies.

4.1 Economic Impacts

The survey of agencies clearly indicated that increased pavement wear was the major concern of most agencies. Safety problems due to increased wear of pavement markings were another concern. However, in most cases the improved stopping distance and/or maneuverability associated with studded tire use generally offset any negative impacts.

Though costs were not requested in the survey, the literature has some data which is useful in defining the economic impacts (Table 4.1). Though most of this information is from Scandinavia, it clearly indicates substantial costs associated with pavement wear, but a potential benefit due to improved (not reduced) safety and reduced winter maintenance (e.g., sanding) costs.

Table 4.2 also provides information on the additional costs associated with the continued use of studded tires on municipal roads and streets in Ontario. As indicated, not only does the cost for pavement maintenance increase, but significant costs can be realized in replacing traffic markings.

Table 4.3 summarizes the impacts of studded tire usage. Clearly the primary reason people use studded tires is for improved maneuverability and control under icy conditions.

4.2 Benefits of Studded Tires

Clearly the primary benefit of studded tires is improved traction (apparent) and hence improved safety. This is noted in the survey of agencies; however, little documentation was provided to substantiate the benefits.

Table 4.1. Annual cost effects of studded tires on pavement wear and safety (for a ban on studded tires).

Agency	Pavement Wear Costs	Winter Maintenance Costs	Accident Costs
Oregon DOT (1974)	+1.1 million	NA	NA
Finland (Pelkonen, 1978)	+175 to 250 million mks	-44 million mks	-0 to 190 million mks
Sweden (VTI - 1988/89)	+160 to 250 million SEK (national roads)	NA	-560 to 1160 million SEK (switch to snow tires)
	+95 to 150 million SEK (municipal roads)	NA	-1230 to 2590 million SEK (switch to summer tires)

Notes:

6 SEK = 1 U.S. dollar
4 mks = 1 U.S. dollar

\+ Increase in costs
\- Decrease in costs

NA = Not available

Table 4.2. Estimate of additional agency costs in Ontario due to the continued use of studded tires (Smith and Schonfeld, HRR 331, 1970).

Financial Year	Department of Highways				Municipalities				Grand Total
	New Pavement Construction[a]	Resurfacing and Patching[b]	Traffic Marking[c]	Total	New Pavement Construction[d]	Resurfacing and Patching[e]	Traffic Marking[f]	Total	
1970-71	608,000	589,000	1,078,000	2,275,000	458,000	470,000	1,078,000	2,006,000	4,281,000
1971-72	625,000	1,533,000	902,000	3,060,000	469,000	1,226,000	902,000	2,597,000	5,657,000
1972-73	855,000	4,298,000	778,000	5,931,000	641,000	3,438,000	778,000	4,857,000	10,788,000
1973-74	683,000	5,769,000	302,000	6,754,000	512,000	4,615,000	302,000	5,429,000	12,183,000
1974-75	625,000[g]	5,960,000[g]	325,000[g]	6,910,000	469,000	4,768,000	325,000	5,562,000	12,472,000
1975-76	625,000[g]	2,250,000[g]	1,325,000[g]	4,200,000	469,000	1,800,000	1,325,000	3,594,000	7,794,000
1976-77	625,000[g]	8,569,000[g]	1,325,000[g]	10,519,000	469,000	6,855,000	1,325,000	8,649,000	19,168,000
1977-78	625,000[g]	18,607,000[g]	1,325,000[g]	20,557,000	469,000	14,886,000	1,325,000	16,680,000	37,237,000
1978-79	625,000[g]	8,578,000[g]	325,000[g]	9,528,000	469,000	6,860,000	325,000	7,654,000	17,182,000
Total	5,896,000	56,153,000	7,685,000	69,734,000	4,425,000	44,918,000	7,685,000	57,028,000	126,762,000

[a]Costs include both concrete and bituminous pavements.
[b]Costs include additional costs of providing more wear-resistant surfaces for the normal resurfacing program.
[c]Additional cost of providing more permanent traffic markings for both new pavements and existing ones.
[d]Taken as 75 percent of corresponding King's Highway figures.
[e]Taken as 80 percent of corresponding King's Highway figures.
[f]Taken as 100 percent of corresponding King's Highway figures.
[g]Estimated figure based on continuance of department's construction and resurfacing program at about the level of preceding years.

Table 4.3. Impacts of studded tire usage.

a) Consequences

Factor	Consequences
Effect on Safety	• Increased rutting, ponding and hydroplaning • Increased splash and spray
Effect on Pavement	• Destruction of pavement markings • Increased rutting • Build up of snow and ice in ruts

b) Benefits

Factor	Benefit
Effect on safety	• Improved stopping distance on ice • Improved maneuverability on ice
Effect on pavement	• None identified

The literature review shows mixed results. Smith et al. (1971) shows a minor benefit in terms of stopping distance on asphalt pavements and mixed benefits on concrete pavements (Table 4.4). This is also shown in Figures 4.1 and 4.2 for wet and dry pavements. However, Figure 4.3 clearly indicates the benefits of studded tires on ice (i.e., significantly improved stopping distances). Finally, it is clear from Figure 4.4 this decrease in stopping distance is not due to increased pavement skid resistance. Work by Smith et al. (published in HRR 352) shows that in most cases the skid resistance decreases with increasing use of studded tires.

Results of a recent skid survey done in Alaska in the summer of 1987 indicated that higher traffic areas were more polished and had lower skid numbers by late summer. However, pavement age was not a factor, so total number of stud passes were not a factor. The conclusion was that studs roughen the pavement and that normal tires polish the pavement (Ryer, 1988).

Table 4.4. Stopping distances from report for the Canadian Safety Council (Smith et al., HRR 352, 1971).

Stopping Distances from 50 miles per hour (in feet) Under Various Road Conditions	Dry Asphalt	Wet Asphalt	Dry Concrete	Wet Concrete	Glare Ice 0°C
Highway tread on 4 wheels	121	151	105	154	640'
Snow tire tread on rear wheels	118	148	106	165	620'
Studded snow tire on rear wheels	117	142	115	177	580'
Studded snow tire on 4 wheels	116	149	122	195	500'

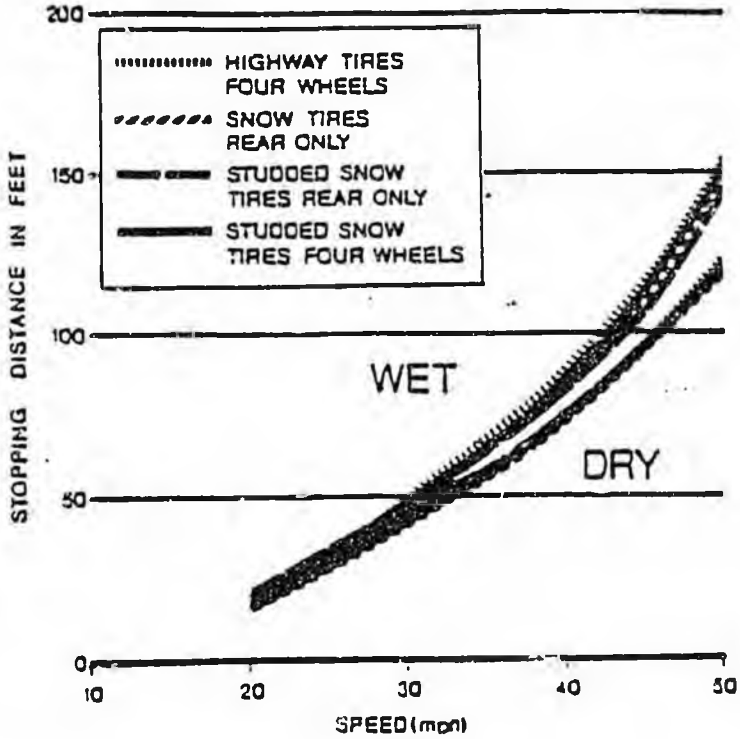


Figure 4.1. Stopping distance versus speed for cars traveling on asphalt pavement (Smith, et al., HRR 352, 1971).

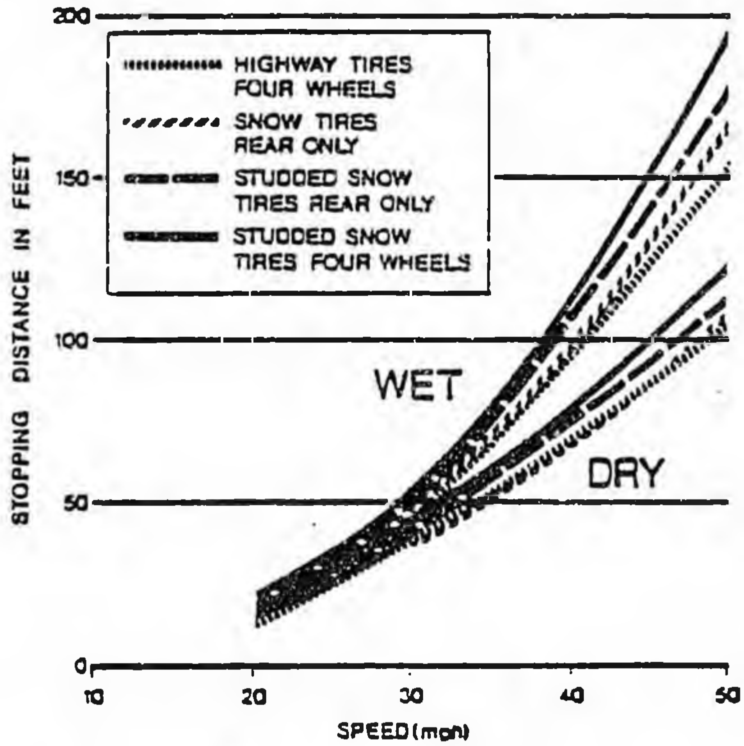


Figure 4.2. Stopping distance versus speed for cars traveling on concrete pavement (Smith, et al., HRR 352, 1971).

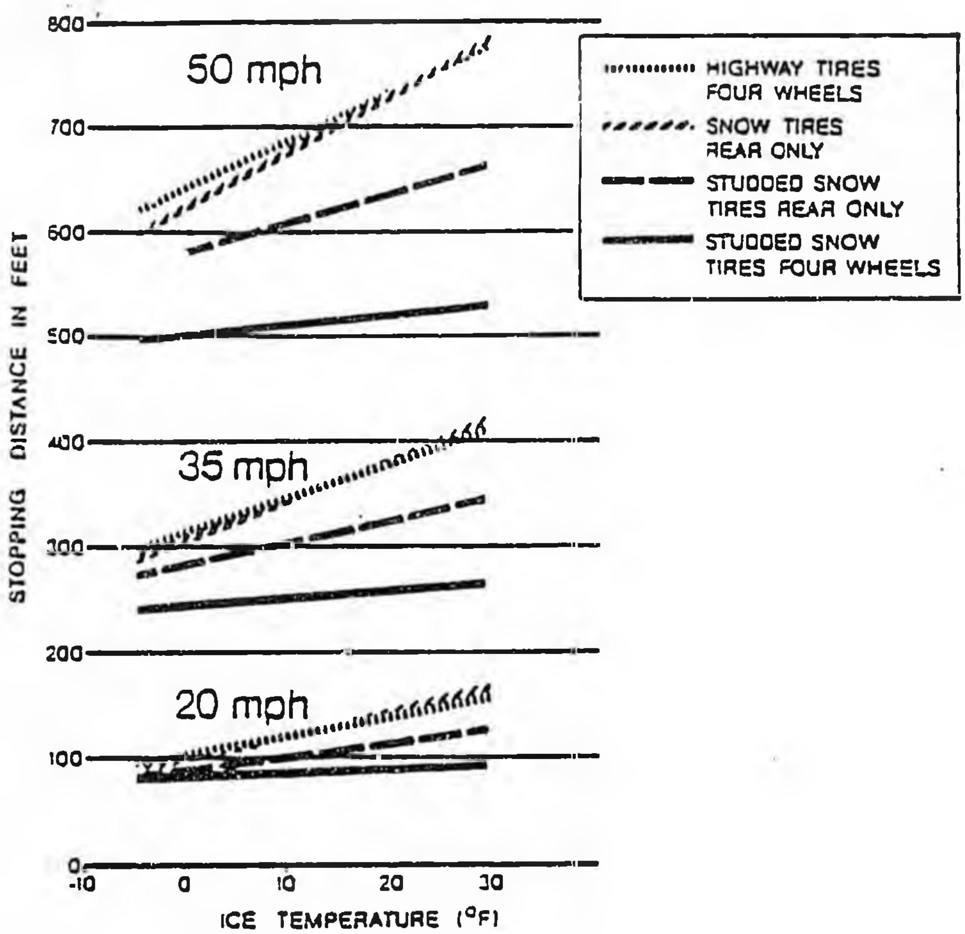


Figure 4.3. Stopping distance versus ice temperature for four cars traveling at 20, 35, and 50 mph (Smith et al., HRR 352, 1971).

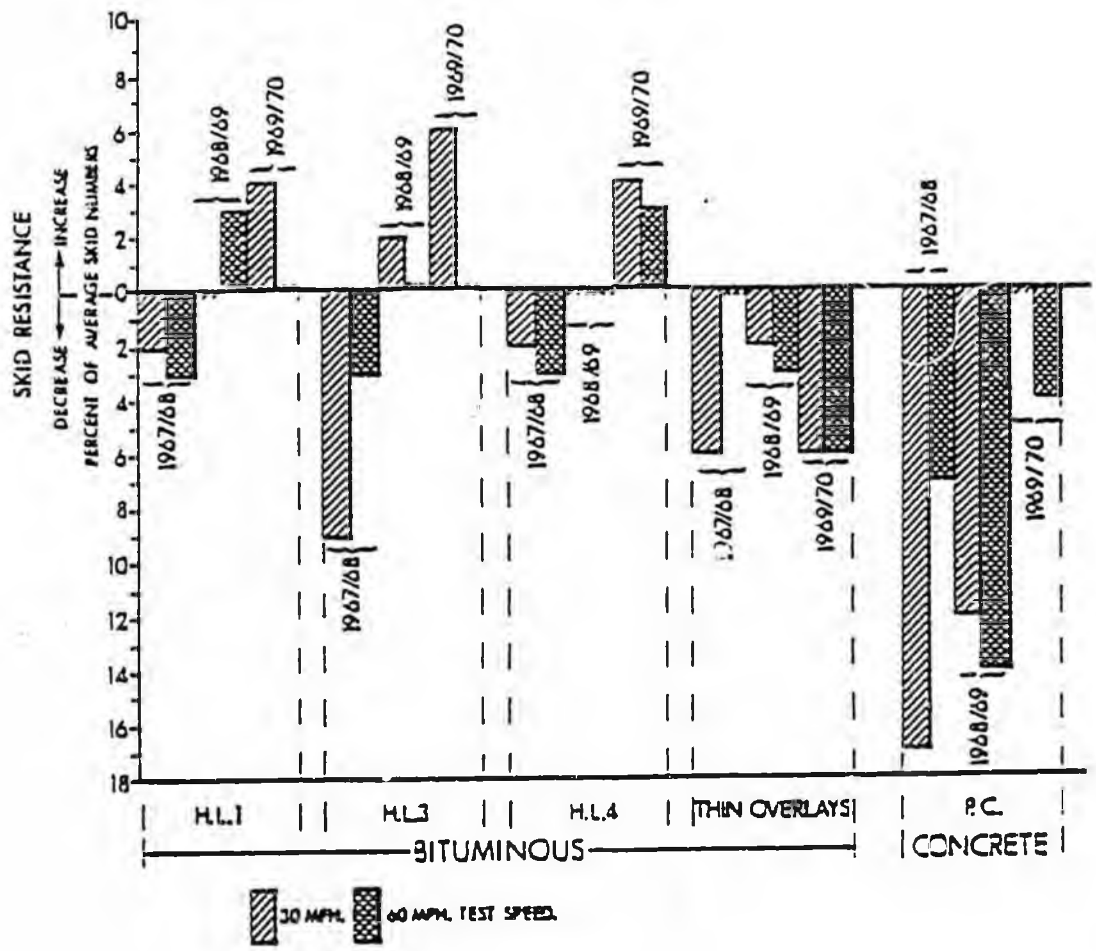


Figure 4.4. Changes in skid resistance of some pavements in Ontario with increasing use of studded tires (Smith and Schonfeld, HRR 352, 1971).

5.0 SUMMARY

This report presented a summary of the results of a literature review and survey of agencies on the use and effects of studded tires. Significant findings include the following facts:

1) Very little research has been done since 1975 in this area, with the exception of the Scandinavian countries.

2) Many agencies continue to prohibit or restrict the use of studded tires.

3) Very little new information on percent of vehicles using studded tires or on tire wear studies was available. Agencies basically do not know the rates of stud use.

4) Factors affecting wear rates were defined (e.g., pavement type, temperature, acceleration and deceleration areas).

5) The consequences and benefits of using studded tires were identified, but remain largely unquantified.

6) Telephone conversations with the manufacturers/distributors revealed that only the controlled protrusion type stud is currently used in the U.S.

Car owners continue to spend millions each year on studded tires for perceived or real benefits. Benefits associated with new tire types, radials instead of bias-ply tires, all-season treads vs. the older summer and winter treads, have not been evaluated in the USA. The shift from rear axle to front axle drive would also increase the effectiveness of studs on the drive axles, since the front axles perform much of the braking work. Therefore the above conclusions may no longer be valid.

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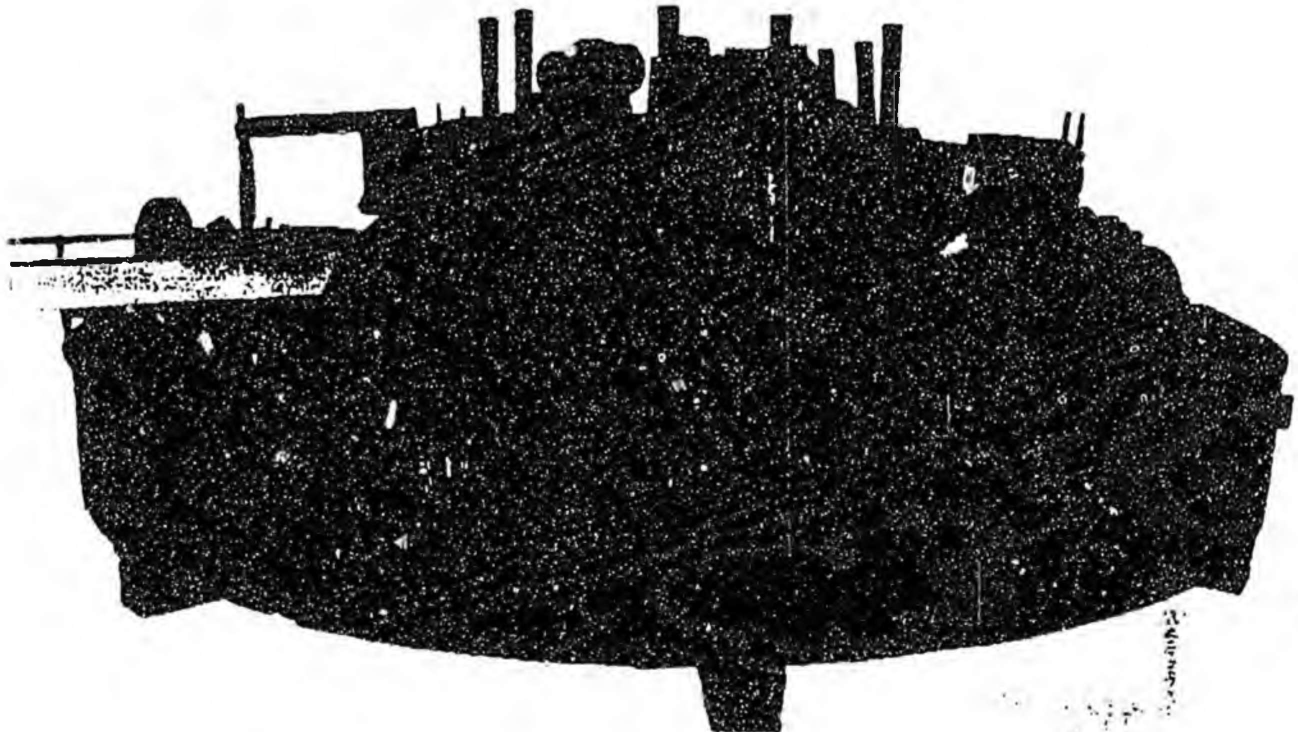


VTI ROAD SIMULATOR

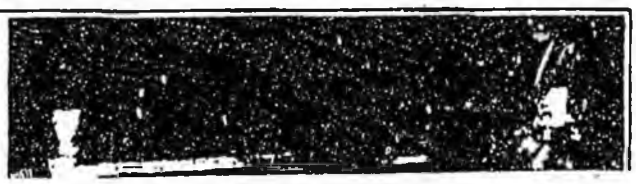
The VTI Road Simulator is a machine for accelerated testing of tyre influence on pavements under controlled conditions.

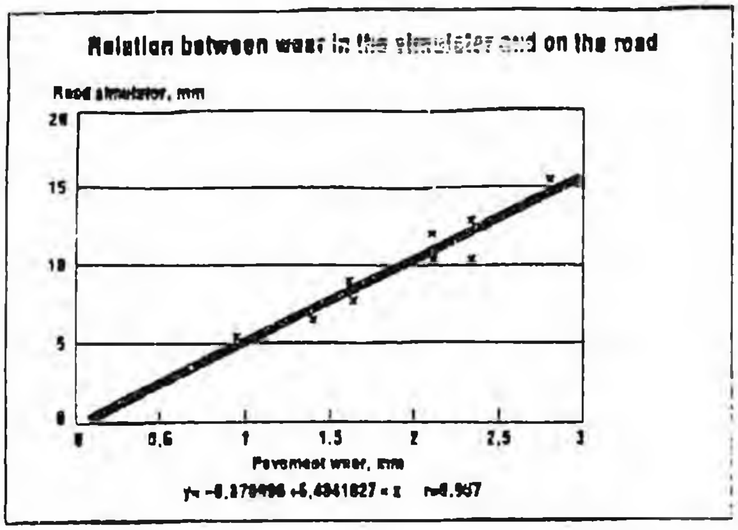
The machine has six wheels rotating on a circular track covered with the pavement material. A separate motor drives each wheel. The diameter of the track is 5.25 m, giving a mean lap length of 16.5 m. The maximum width of the track is 0.85 m.

The wheels can be fitted at various radial distances from the centre of the machine and the machine's axis can be slowly moved laterally while running by means of an eccentric device. This enables all wheels to be moved in and out a total of 60 mm. The lateral movement is especially important when using studded tyres, which would otherwise produce narrow ruts after each line of studs.

The pavement of the machine can be sprayed with water and the hall in which the machine stands can be cooled to −20°C. The speed of the machine can be varied, but the maximum speed is limited according to the wheel load. With the present design, the maximum speed is 85 km/h for a wheel load of 5 kN. Truck or car tyres with conical or conventional treads can be used. Normally, the machine is run with conventionally studded car tyres, size 185/70 R14.

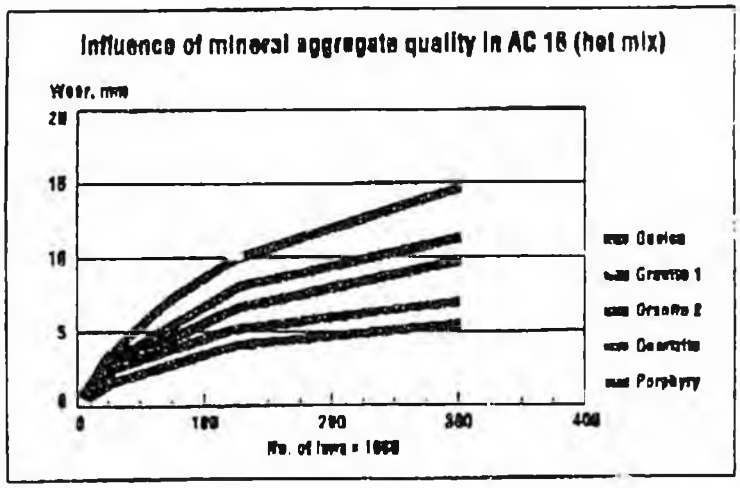
Determination of wear is performed from cross-sections recorded perpendicularly to the direction of travel. Measurement uses an





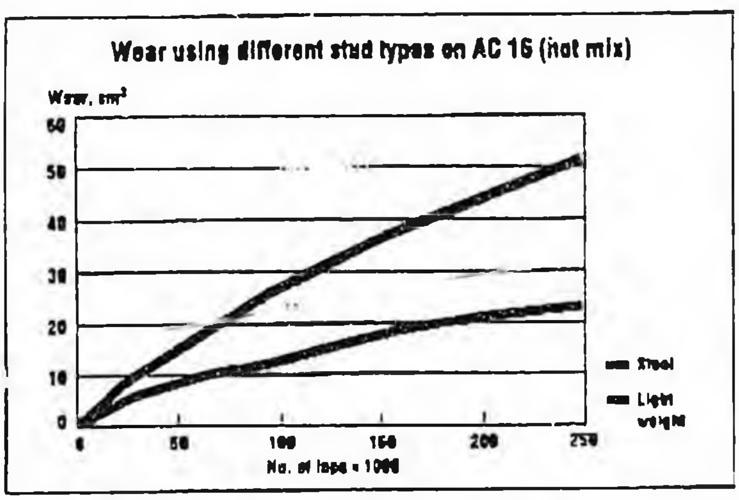
RELATION BETWEEN SIMULATOR AND FIELD TESTS

The simulator has shown excellent correlation with pavement wear in the field. The diagram indicates the relation between the wear on test slabs laid on the road and in the simulator. Pavement type AC 12 and 16 (hot mix).



STUDIES OF PAVEMENT MATERIAL

In studies of resistance of pavements to studded tyres, laboratory rolled slabs with known compaction and composition were tested. The parameters that can be studied include the effect of pavement type, binder, mineral aggregate quality, particle size etc.



STUDDED TYRE TESTS

The development of studs for car tyres has resulted in a steady reduction of stud mass. Among new studs on the market are types with plastic or alloy mantle surrounding a hard metal pin. Tests with these lightweight studs have been performed in the road simulator. The results show that the lightweight studs produce considerably less wear on the pavement than the heavier conventional steel studs.

Examples of other applications

- *testing traffic count cables*
- *testing wear on surface condition sensors*

Publisher:
Swedish Road and Traffic Research Institute
Swedish Road and Traffic Research Institute • S-581 01 Linköping Sweden

Publication: VTI RAPPORT 377
Published: 1992
Project code: 43361-5
Project: Tests with lightweight tyre studs in the VTI's pavement testing machine
Sponsor: Swedish National Road Administration

Author:
Kent Gustafson

Title: Tests with lightweight tyre studs in the VTI's pavement testing machine

Abstract (background, aims, methods, results) max 200 words:

The use of studded tyres, while having a direct effect on traffic safety, gives rise to a number of problems and increased costs, especially on roads with high traffic volumes. The wear from studs contributes to rutting and shorter pavement life. In the latest investigation of studded tyres, carried out in 1989, the cost of pavement wear from studded tyres was estimated at SEK 250—300 million per year for the Swedish road network. In recent years, new types of lightweight studs have appeared on the market, which may reduce pavement wear and consequent expense.

At the VTI, a special machine for accelerated testing of pavement wear is being used to perform investigations under controlled conditions. Using the machine, a study has now been completed on two types of lightweight studs, one with a plastic body and the other of light metal.

Tests using plastic studs have been performed at two speeds, 60 and 85 km/h, while the light metal stud has been tested only at the higher speed. With the exception of one case, the test runs have been made on an dense asphalt concrete (AC) pavement with normal wear resistance. In one run, plastic studs were also tested on Stone Mastic Asphalt (SMA) pavements with high wear resistance.

On both the highly wear-resistant and normally wear-resistant pavements, abrasion from the lightweight plastic studs was generally about half that from corresponding steel studs. However, the absolute wear level naturally differed according to the wear resistance of the particular pavement. For example, the most wear-resistant pavements in the tests, SMA pavements with very high quality aggregate demonstrated 3-5 times less abrasion than the "normal pavement" with locally obtained aggregate. Also abrasion from the light metal studs was considerably lower than from the conventional steel studs and even lower than from the somewhat lighter plastic studs. Light metal studs produced only about one third, 35 %, as much wear as steel studs. The corresponding ratio between plastic and steel was 44 %.

The tests showed that speed is of great significance for pavement wear. Abrasion increased significantly at higher speed. Steel studs gave almost the double amount of wear at 85 km/h compared to 60 km/h.

To obtain an idea of the wear-resistance of the studs, stud protrusion has also been measured. The decrease in protrusion was of the same order of size for plastic studs as for light metal and steel studs. Thus, the results do not indicate any significant difference in wear resistance between the various types of stud.

The conclusion from the investigation is that the lightweight studs that have been tested reduce pavement wear by about half. The calculated cost of this wear could thereby be halved within a few years when these studs have replaced the conventional steel stud.

Keywords:

ISSN: Language: No. of pages:

Tests with lightweight tyre studs in the VTI's pavement testing machine

by Kent Gustafson
Swedish Road and Traffic Research Institute (VTI)
S-581 01 Linköping
Sweden

Summary

The use of studded tyres, while having a direct effect on traffic safety, has also had certain negative effects. Perhaps the most tangible of these pavement wear, contributing to rutting and shortened life of the wearing course, especially on roads with heavy traffic volumes. In the latest Swedish investigation of studded tyres, conducted in 1989, the cost of pavement wear as a direct result of studded tyres was estimated at SEK 250—300 million per year for the Swedish road network as a whole.

The extent of the wear caused by studded tyres depends on a number of factors, as stated in the report. One critical factor is the design and weight of studs. For many years, the basic principle of the tyre stud for passenger cars has been a hard metal pin enclosed in a mantle of steel, the whole stud having a weight of about 2 g. In recent years, however, several tyre and stud manufacturers have carried out intensive development to find a stud that is less aggressive to pavements. This work has resulted in studs of new design and/or weight, which are expected to reduce pavement wear.

At the VTI, a special machine for accelerated testing of pavement wear is being used to perform investigations under controlled conditions. Within a relatively short time, the machine produces a rut depth which is comparable to many years pavement wear on a road with large traffic volumes. In this study, the machine has been used to investigate pavement wear from tyres fitted with lightweight studs.

Tests have been conducted with the two types of lightweight studs which have so far captured a certain share of the Swedish market, in addition to conventional steel studs. One of the lightweight studs, "BETEK", has a body of plastic and weighs 0.7 g. These studs were fitted to Gislaved "Nord Frost" tyres. The other type of lightweight stud, "Eurometec", is made of light metal and weighs 0.95 g. These were fitted to Goodyear "Ultra Grip" tyres.

All test runs except one took place on a pavement of normal wear resistance, asphalt concrete (AC). In addition, one run was made on pavements with very good wear resistance, having asphalt wearing courses of high aggregate content and the best abrasion resistance, so called Stone Mastic Asphalt (SMA). The aim of the runs on wear-resistant pavements was to study whether the results obtained on a normal pavement also applied to these types of asphalt concrete.

The tests comprised a total of four types:

— Wear from plastic studs and steel studs at 60 km/h
— Wear from plastic studs and steel studs at 85 km/h
— Wear from plastic studs and steel studs at 85 km/h on highly wear-resistant pavements
— Wear from light metal studs and steel studs at 85 km/h

In the first two runs, with both plastic studs and steel studs, the speed was 60 km/h and the AC pavement with locally produced aggregate. The test comprised a total of 150,000 rotations in ecah case and the rut depth was about 10-15 mm at the end of the run. The result showed that pavement wear from the lightweight plastic stud was considerably less than that from the conventional steel stud. After the run, pavement wear from the lightweight stud was found to be 65 % of that from the steel stud at this speed, 65 km/h.

Three runs were performed at 85 km/h, two with steel studs and one with a lightweight plastic stud. Two somewhat different steel studs were tested, a single-shouldered stud weighing 1.8 g and a double-shouldered stud weighing 2.1 g. Despite some variation in design and weight, the difference in pavement wear between these two types of stud was very marginal. The small difference between the two runs also shows that the reproducibility of the tests is fairly good.

As in the runs at lower speed, the difference in abrasion between the lightweight plastic stud and the conventional steel stud in runs was relatively great also in this case. After 150,000 rotations, the lightweight stud had caused abrasion equal to only 44 % and 47 % of that from the single-shouldered and double-shouldered types respectively, compared to the steel stud. At 250,000 rotations, the plastic stud had caused wear equal to only 44 % of that from the double-shouldered steel stud at this speed, 85 km/h. The large difference in wear also appeared in the maximum rut depth measured in the pavements. After 250,000 rotations, rut depth was about 15 mm for plastic studs and about double, 30 mm, for steel studs.

The tests on pavements of varying wear-resistance showed that abrasion in absolute levels differs greatly between pavement types. Particularly large was the difference between, on the one hand, the conventional pavement with normally wear-resistant aggregate and, on the other hand, the highly wear-resistant pavements with good quality aggregate and generally a high content of coarse material. The highly wear-resistant pavements showed abrasion usually only one fifth to one third of that on the conventional AC pavement with local aggregate.

However, the difference between the wear from lightweight plastic studs and conventional steel studs changed very little among the pavement types. The smallest difference was found for an AC (with maximum 20 mm aggregate) pavement, where the abrasion from plastic studs was 57 % of that from steel studs, and the largets difference was found on an SMA (with maximum 16 mm aggregate) pavement, where the corresponding figure was 37 %.

Summing up, the difference in wear between the new lightweight studs with a body of plastic and conventional steel studs is relatively constant for different pavement types. On both highly wear-resistant and normally wear-reistant pavements, abrasion from the lightweight studs is generally about half the corresponding abrasion from steel studs.

However, the absolute wear level naturally depends on the wear resistance of the particular pavement. For example, the most wear-reistant pavements in the tests, SMA pavements with very good quality aggregate (porphyry) showed 3-5 times less abrasion than the "normal pavement", AC with local aggregate.

Tests similar to those above have also been conducted with light metal studs. The speed was 85 km/h and the pavement was of the same type as previously: AC with local aggregate. The run with light metal studs was continued until 300,000 rotations had been completed. The same number of rotations had earlier been made with plastic studs and somewhat fewer, 250,000 rotations, with steel studs on a similar pavement, thereby allowing a comparison to be made.

The abrasion from the light metal studs was considerably less than that from the conventional steel studs and even lower than that from the somewhat lighter plastic studs. After 250,000 rotations, the ratio between light metal and steel was only 35 %, i.e light metal studs produced wear that was only about one third of that from the steel studs. The corresponding ratio between plastic and steel was 44 %. The reason for this difference between the two types of stud can only be surmised, but may be due to differences in stud design, pressure or wear during the run. Otherwise, it would be natural for the lightweight plastic stud to produce less wear than the light metal stud.

The tests on the effects of steel studs and plastic studs on asphalt pavements have been performed at two speeds, 60 and 85 km/h, and it is therefore possible to study the effect of speed on abrasion and whether the various types of stud are similar in this respect.

This study, like many others, has shown that speed is of great significance in regard to pavement wear. Abrasion increases considerably when speed increases. For steel studs, abrasion after 150,000 rotations at 85 km/h was 86 % greater than at 60 km/h. After a smaller number of rotations, the increase was even greater, so that the increase from 60 to 85 km/h led to an overall increase of appr. 100 % in pavement wear for conventional steel studs

In the case of plastic studs, speed does not have fully the same influence on abrasion. A speed increase from 60 to 85 km/h increased wear by 44 % after 150,000 rotations. The fact that speed has a lesser influence in the case of the lightweight plastic stud compare to the conventional steel stud is probably because the former is in itself less aggressive to the pavement owing to its lower weight. The influcence on pavement wear from both speed and stud weight is probably exponential, i.e. the increase in wear becomes higher at higher speed and higher stud weight respectively.

The pavement testing machine is primarily designed for investigations of the effects of tyres on road surfaces, in particular pavement wear. However wear on tyres and studs is somewhat different to that in normal traffic, where there is a combination of acceleration, braking, cornering, etc. Since the tyres in the pavement testing machine rotate constantly in a very tight circle, the wear on the studs is much heavier. To obtain a certain idea of the wear resistance of the studs being tested, the stud protrusion has been recorded. However, it must be emphasised that the protrusion observed cannot be compared in absolute terms with protrusion in normal conditions, but only against other measurements made in the same context.

Stud protrusion was recorded in most cases after 500 kilometres ("zero" measurement) and after each 50,000 rotations. However, there were deviations from this routine. The results of the stud protrusion measurements when running at 60 km/h showed that protrusion was almost constant for the steel studs, while the plastic studs showed reduced protrusion. A comparison between the two types of stud shows that the plastic studs had somewhat greater wear in this case.

The results for the three runs, one with plastic studs and two with steel studs, at 85 km/h showed that the difference in protrusion was relatively great, even for new tyres The plastic studs had the smallest protrusion, an average of 1 13 mm, while the steel studs had a protrusion of 1 32 mm (single shoulder) and 1.59 mm (double shoulder). A comparison of the wear resistance of the studs thus refers to the decrease in protrusion and not the absolute protrusion A comparison between plastic studs and single shoulder steel studs after 150,000 rotations showed that the decrease in protrusion was very similar. For both types, the decrease was 0.4 mm. In this case, the plastic studs had a wear resistance comparable to steel studs. The same applies even in a comparison with the other steel stud, the double shoulder type. For this steel stud, protrusion decreased from 1.59 mm to 0.60 mm, i.e. about 1 mm, after 250,000 rotations, while the decrease in protrusion of the plastic stud was about 0.6 mm, from 1.13 mm to 0.50 mm, after 300,000 rotations.

A third comparison of stud protrusion for lightweight plastic studs and conventional steel studs was performed in the run on wear-resistant pavements. Neither in this case did the results reveal any difference in wear resistance between the two types of stud compared, the decrease in protrusion being of the same order of size. In general, the lightweight type of stud had similar wear resistance compared to the conventional steel stud in the reported tests.

The change in stud protrusion in tests with light metal studs has been investigated in the same way as above. The protrusion of the light metal stud was recorded both on new tyres and after 150,000 and 300,000 rotations. From the beginning, the light metal studs had the smallest average protrusion of the types tested, about 1 mm. By the and of the run, the protrusion had decreased to 0.60 mm. This decrease is smaller than that of the other two types of stud after the same number of rotations. As with the plastic studs, the result therefore indicates no reason to fear that the wear resistance of these studs is poorer than that of conventional studs.

The conclusion from the reported investigations is that, given full market coverage, the lightweight types of stud of plastic and light metal will reduce pavement wear from tyre studs by about half within a few years. This means a cost saving of SEK 125-150 million according to the calculations in the latest investigation on studded tyres. Reduced pavement wear naturally also means other positive effects for the environment.

A number of other factors concerning the extent of pavement wear have also changed since the latest investigation on studded tyres. The use of highly wear-resistant SMA pavements has increased in recent years and has spread to other roads and streets besides those with the heaviest traffic. SPS (Specific wear = pavement wear in gram per km of road and vehicle with studded tyres) ratios under 10 are not uncommon for this type of pavement and the average SPS ratio for the Swedish road network in 1989 (calculated at 30 in the investigation) should therefore have fallen somewhat. A further decrease is expected since this type of pavement is being laid to a greater extent than before.

Another factor that may be assumed to have a positive influence in reducing pavement wear is the change in painted lane markings now being introduced on a wider scale. Today, 13 metre roads are in some cases being painted with lanes 5.5 metres wide. The traffic is thereby distributed more evenly across the road and pavement wear is thereby less concentrated. Moving the markings laterally on motorways is another alternative that also leads to less concentrated rutting, according to initial experiments.

In general, the use of lightweight studs, together with the other factors mentioned above, may contribute to a decrease in pavement wear from studded tyres to about half the present level within a few years. This means that the cost of pavement wear from studded tyres could be reduced to a figure in the region of SEK 100 million per year, a relatively modes level in relation to the positive effect on road safety resulting from the use of studded tyres. Results so far also show that these new lightweight studs have the same road grip and wear reistance as the conventional steel studs. The positive effect on traffic safety with these new studs would therefore be of the same order of size as earlier.

In defense of studs

Experts suggest limits, light version of winter tires

By STEVE RINEHART
Daily News reporter

With road ruts deepening in Anchorage and Juneau, the state's chief highway research engineer called Tuesday for limits on the use of popular studded winter tires.

The state estimates every studded tire sold adds $50 to road maintenance costs, engineer David Esch told a discussion panel at the Winter Cities conference in Anchorage. Fixing stud ruts costs about $5 million a year, he said.

The highway department is not looking to ban studs, Esch said, but it is backing legislation to require the use of newer, lightweight studs. The department also wants a shorter studded-tire season and more enforcement of the summer stud ban, he said.

On one high-traffic Juneau road, Esch said, studded tires chiseled through nearly an inch of pavement in four years. In Anchorage, tire ruts on Muldoon Road got so dangerously deep that the state put down temporary pavement last summer, just to hold the road over until this year's scheduled pavement reconstruction project. Project manager Bill Goodell said the ruts averaged nearly 2 inches, and in places were 4 inches deep. The one-year patch-up job cost about $250,000, he said.

A leading North American tire stud distributor took issue with Esch's findings Tuesday. Bruno Wessel, of Sarasota, Fla., claimed the state's road-wear studies are based on faulty research. He said studs cause some wear, but he blamed heavy trucks and other factors for grooving the pavement.

But Esch said it's obvious to him that

Please see Page C-3, **TIRES**

TIRES: Experts suggest limits

Continued from Page C-1

studs cause the ruts. The tracks are the width of a car, he said; the ruts are the width of a car tire. He estimated that half the cars in Alaska have studs.

"The public wants to blame these ruts on the trucks, and does not want to admit it is studs," he said.

The conference is intended to bring together experts from northern countries to figure out smarter ways to live in wintry places.

Scandinavians, considered the world's experts on winter driving, told Tuesday's panel they think studded tires are great, even if they do tear up the roads.

Finnish transportation researchers have devised an elaborate equation to compare the costs to the benefits of studded tires. For example, studded tires cost consumers more, and require the state to do more road maintenance, and they make the road rough, which slows down traffic in the summer. But they speed traffic up in the winter and save 300 million Finnish marks a year — about $60 million — by preventing accidents.

In a country where 95 percent of the cars have studded winter tires, the pluses outweigh the drawbacks, said Asko Saarela, a professor at the Technical Research Center of Finland.

The Swedes, too, have concluded studs save more than they cost. Without studs, "there would be a dramatic increase in accidents," according to Kent Gustafson of the Swedish National Road Administration.

But the road damage from studs cannot be ignored, he said, so Sweden is switching to lightweight studs and is reducing the allowable number of studs in each tire.

HOUSE COMMITTEE REPORT

(7)

Date Referred: May 6, 1993 FURTHER REFERRALS: State Affairs
Finance

Date of Committee Action: 2/25

The LABOR AND COMMERCE Committee considered: HB 302

HOUSE BILL NO. 302 WORKERS COMP FOR RECREATIONAL ACTIVITIES

"An Act excluding certain recreational activities sponsored by an employer from coverage provided under workers' compensation, unless participation is required as a condition of employment; and providing for an effective date."

RECOMMENDATIONS: [ ] the same title
be replaced with ______ [ ] a new title

[ ] have attached amendments(s)
[✓] do pass
[ ] do not pass
[ ] no recommendations
[ ] individual recommendations
[ ] additional referral to the ______ Committee

ADOPTS: ______ letter of Intent

ATTACHES NEW FISCAL NOTE(s): (Dept) APPROVES PREVIOUS: (Dept/Date)

[ ] fiscal impact ______ [ ] fiscal note(s) ______

[X] zero fiscal note LABOR [ ] zero fiscal note(s) ______

SIGNING DO PASS	DP	OTHER RECOMMENDATIONS	DNP	NR	AM
Brian D. Porter	✓				
[illegible]	—				
[illegible]	✓				
Bill Hudson	✓				

Bill Hudson
CHAIRMAN'S SIGNATURE

MIKE NAVARRE
REPRESENTATIVE

DISTRICT 9

During Session
State Capitol
Juneau, AK 99801-1182
(907) 465-3779

Home Address
Box 169 — Kenai, AK 99611
(907) 262-7842

ALASKA STATE LEGISLATURE
HOUSE OF REPRESENTATIVES

SPONSOR STATEMENT

February 22, 1994

TO: Representative Bill Hudson, Chairman, House State Labor & Commerce Committee

FROM: Representative Mike Navarre Mike

SUBJECT: House Bill 302, An Act excluding certain recreational activities from workers' compensation coverage.

House Bill 302 offers a solution to recreational sponsorship by saying that as long as the participation is voluntary and not a condition of employment then no workers' compensation liability extends to the employer/sponsor.

Recent interpretations of law have placed generous Alaskan employers in jeopardy concerning team sponsorships. Recreational activities funded by an employer, according to court interpretation, implies liability for injury that occurs while the employee is participating in an optional recreational activity. For example, an employer supplies uniforms, umpiring fees, field rental fees or other team related items, the courts have treated that involvement as an employer-sanctioned activity. The result has been that many employers are reluctant to increase their risk and legal exposure for a recreational activity and are less likely to support recreational leagues throughout Alaska.

DIVISION OF LEGAL SERVICES

LEGISLATIVE AFFAIRS AGENCY
STATE OF ALASKA

(907) 465-3867 or 465-2450
FAX (907) 465-2029
Mail Stop 3101

130 Seward Street, Suite 409
Juneau, Alaska 99801-2105

M E M O R A N D U M — February 23, 1994

SUBJECT: Civil liability for commercial recreational activities - (HB 300)

TO: Representative Bill Hudson

FROM: Michael F. Ford *M. F.*
Legislative Counsel

You have asked for a general explanation of the effects of HB 300. The bill would, in my opinion, have its most significant effect in fixing the responsibilities of participants in recreational activities and operators of recreational activities. In sec. 05.45.030 and sec. 05.45.040 the bill lists these responsibilities. This should in some measure reduce the uncertainty regarding the legal responsibility for injuries resulting from recreational activities. While the bill also addresses inherent risks (in sec. 05.45.010) and contributory negligence (in sec. 05.45.020) these provisions are not significantly different from the existing system for allocating fault described under AS 09.17.

This bill will not immunize operators of recreational activities or eliminate litigation over injuries or property damage that occurs during a recreational activity. However, this bill may reduce the time spent in litigation by clearly indicating the responsibilities of each party when an accident occurs during a recreational activity.

Please contact me if you have further questions.

MFF:gc:pl
94-154.glc

8-LS1103\A.1
Ford
2/23/94

AMENDMENT

OFFERED IN THE HOUSE BY REPRESENTATIVE HUDSON

TO: HB 300

Page 2, line 13, after "person":

Insert ", the participant's children,"

Page 2, after line 31:

Insert a new paragraph to read:

"(1) "children" means persons under 18 years of age;"

Renumber the following paragraphs accordingly.

8-LS1103\A.2
Ford
2/23/94

AMENDMENT

OFFERED IN THE HOUSE BY REPRESENTATIVE HUDSON

TO: HB 300

Page 2, lines 24 - 25:

Delete "basic first aid"

Insert "cardiopulmonary resuscitation"

8-LS1103\A.3
Ford
2/23/94

AMENDMENT

OFFERED IN THE HOUSE

BY REPRESENTATIVE HUDSON

TO: HB 300

Page 3, lines 2 - 4:

Delete all material.

Renumber the following paragraph accordingly.

MIKE NAVARRE
REPRESENTATIVE

DISTRICT 9

ALASKA STATE LEGISLATURE
HOUSE OF REPRESENTATIVES

During Session
State Capitol
Juneau, AK 99801-1182
(907) 465-3779

Home Address
Box 169 — Kenai, AK 99611
(907) 262-7842

MEMORANDUM

TO: Representative Bill Hudson, Chairman, House Labor & Commerce Committee

FROM: Representative Mike Navarre Mike

SUBJECT: House Bill 302, An Act excluding certain recreational activities from workers' compensation coverage.

DATE: February 22, 1994

****

I would like to request a hearing for House Bill 302, "An Act excluding certain recreational activities sponsored by an employer from coverage provided under workers' compensation, unless participation is required as a condition of employment; and providing for an effective date."

Thank you for your consideration.

APPENDIX—Continued

Villages' subsistence life styles would be minimally affected by the Cascaden disposal. There was a reasonable basis for the decision by DNR to hold the land disposal at Cascaden. The decision was not unreasonable, arbitrary, or an abuse of discretion. The Decision of the DNR is hereby affirmed.

DATED at Fairbanks, Alaska, this 24 day of May, 1990.

/s/ Richard D. Savell
RICHARD D. SAVELL
Superior Court Judge

Judi J. LeSUER-JOHNSON, Appellant,

v.

ROLLINS-BURDICK HUNTER OF ALASKA and National Union Fire Insurance Co., Appellees.

No. 3681.

Supreme Court of Alaska.

April 12, 1991.

Employee who was injured while playing softball on employer-sanctioned team at employer-provided field sought workers' compensation benefits. The Workers' Compensation Board awarded benefits and the Superior Court reversed and remanded. On remand, the Board denied benefits and appeal was taken. The Superior Court, Third Judicial District, Anchorage, Ralph Stemp, J., affirmed and employee appealed. The Supreme Court held that employee was entitled to benefits.

Reversed and remanded.

1. Workers' Compensation ⚷664

Employee who was injured while playing softball on employer-sanctioned team at field rented by league to which employer paid money for ball field rental was entitled to workers' compensation benefits. AS 23.30.265(2).

2. Workers' Compensation ⚷664

Portion of workers' compensation statute defining "arising out of and in the course of employment" with regard to employer-sanctioned activities at employer-provided facilities is not limited to remote job sites as statute is written. AS 23.30.-265(2).

Chancy Croft, Anchorage, for appellant.

Patricia L. Zobel, Deirdre D. Ford, Staley, DeLisio, Cook & Sherry, Anchorage, for appellees.

Before MATTHEWS, C.J., and RABINOWITZ, BURKE, COMPTON and MOORE, JJ.

OPINION

PER CURIAM.

[1] Appellant Judi LeSuer-Johnson (LeSuer) was injured on June 4, 1986, while playing softball at an Anchorage ballpark for the Rollins-Burdick Hunter (RBH) team against an "insurance league" opponent. The injury occurred after work hours, on a field rented by the insurance league. LeSuer, an employee of RBH, filed a claim for workers' compensation, alleging that the injury arose out of and in the course of her employment. An Alaska statute enacted in 1982 defines "arising out of and in the course of employment" to include

> employer-required or supplied travel to and from a remote job site; activities performed at the direction or under the control of the employer; and employer-sanctioned activities at the employer-provided facilities; but excludes activities of

a personal nature away from employer-provided facilities.

AS 23.30.265(2).

LeSuer's argument that her injury arose out of and in the course of her employment is based on her employer's connection to the softball team. RBH provided balls, bats, T-shirts and caps for the team members. It paid $250 to the league's organizers who rented the ballfield and purchased bases. RBH encouraged its employees to either play on the team or attend the game as spectators. In her job interview LeSuer was asked if she played softball and if she would like to play on the company team. She stated that joining the team was voluntary, but she personally felt pressured to play by co-employees who wanted to be sure that RBH had enough players to field the team each week.

The Workers' Compensation Board found for LeSuer. The board concluded that participation on the softball team was both employer-sanctioned and that it occurred at an employer-provided facility:

> We find RBH gave support and encouragement for their employees to participate on the team. By paying the league fee, providing part of the uniform, providing bats and balls and permitting employees to perform activities such as picking up the T-shirts and hats as part of their work duties RBH sanctioned the activity....
>
> Next we consider whether the injury occurred at an employer-provided facility. Defendants argued that the injury was not on Employer's premises. However, the legislature chose to use the term "facility" and not premises. We find this terminology distinction is important. Thus the injury does not have to occur on an employer's property to be compensable.
>
> The term "provide" is defined in *Webster* at 1144 as "to make available, supply, afford; furnish with...." We find that paying the league fee RBH made available to its employees a field on which to play softball. We conclude that the softball game was at an employer-provided facility.

RBH appealed the board's decision to the superior court. The court held that where, as here, a remote job site was not involved, a four-part test rather than the two-part test set out in the statute was appropriate. The court stated:

> The criteria analyzed in Larson, 1A *The Law of Workman's Compensation* § 22.24(a)-(f), for determining whether an injury on a company team is compensable are the appropriate factors to weigh in deciding this case. They are primarily the time and place of the recreation, the degree of the employer initiative and encouragement, the financial support and equipment furnished, and the benefit to the employer.

The court remanded this case to the board for an analysis using these factors. On remand, the board found in favor of RBH with one member dissenting.

LeSuer then appealed to the superior court, which affirmed the board's decision on remand. LeSuer now appeals this decision.

[2] In our view, the first decision of the board was correct. That portion of AS 23.30.265(2) which pertains to employer-sanctioned activities at employer-provided facilities is not limited to remote job sites as the statute is written. If the legislature had intended such a limitation it could have easily been expressed. The board's conclusions that playing for the RBH softball team was employer-sanctioned and that the injury occurred at an employer-provided facility are supported by substantial evidence.

For the above reasons, the decision of the superior court is REVERSED and this case is REMANDED to reinstate the first decision of the board.

KEY NUMBER SYSTEM

REPRESENTATIVE
GENE THERRIAULT
P.O. Box 55326
North Pole, Alaska 99705
(907) 488-0862

House District 33

Alaska State Legislature

House Of Representatives

While in Juneau
State Capitol
Juneau, Alaska
99801-1182
(907) 465-4797

To: Representative Bill Hudson
Labor & Commerce Committee

From: Representative Gene Therriault G.T.

Date: January 20, 1994

Subject: Request to Schedule HB 308

I would like to request that you schedule HB 308, "An act prohibiting the direct or indirect contribution or payment of the net proceeds of a bingo or pull-tab game to candidates for public office; and relating to the definition of "political organization" as that term is used in the laws relating to charitable gaming," for a hearing before the House Labor & Commerce Committee.

As you requested in your memo of January 15, 1993, attached to this memorandum are:

1.) Sponsor Statement
2.) Sectional Analysis
3.) Current Fiscal Note
4.) Current Departmental Position Paper

The adoption of this bill will disallow the use of bingo or pull-tab net proceeds for direct political contributions to candidates. All non-profits, including political parties and labor organizations, would still be allowed to hold permits and use their proceeds for administrative expenses or other uses. They would be allowed to continue to use raffles and other permitted games to earn money that could then be used for direct contributions to candidates. In addition, it clarifies that a "political party" is a political organization for purposes of charitable gaming under existing law.

I respectfully request that you schedule a hearing on HB 308 at the committee's earliest convenience. Thank you.

Alaska State Legislature

REPRESENTATIVE
GENE THERRIAULT
P.O. Box 55326
North Pole, Alaska 99705
(907) 488-0862

House District 33

While in Juneau
State Capitol
Juneau, Alaska
99801-1182
(907) 465-4797

House Of Representatives

HB 308: "An act prohibiting the direct or indirect contribution or payment of the net proceeds of a bingo or pull-tab game to candidates for public office; and relating to the definition of 'political organization' as that term is used in the laws relating to charitable gaming."

Sponsor: Representative Gene Therriault

Sponsor Statement:

The adoption of this bill will disallow the use of bingo or pull-tab net proceeds for direct political contributions to candidates. All non-profits, including political parties and labor organizations, would still be allowed to hold permits and use their proceeds for administrative expenses or other uses. They could also still use raffles and other permitted games to earn money that could then be used for direct contributions to candidates. In addition, the legislation clarifies that a "political party" is a political organization for purposes of charitable gaming under existing law.

I support political fund raising only when those people contributing money know exactly to whom or what cause their contribution is going. I am uncomfortable with the fact that, under current law, a person may unknowingly contribute to a cause that is 180 degrees opposite from his or her political beliefs, regardless of whether those beliefs are liberal or conservative. Although gaming is philosophically objectionable to a certain segment of society, I believe those objections can be outweighed if gaming proceeds are legitimately aiding a worthwhile non-profit cause, such as the Food Bank or Girl Scouts. I do not believe, however, that political candidates qualify under those guidelines. This legislation would help rectify that situation.

Sectional Analysis of House Bill 308

Date: January 17, 1994

Section 1. Adds a provision to AS 05.15.150(a) prohibiting the use of net proceeds from charitable gaming activities for candidates for public office or that candidate's organization. This bill would eliminate this funding source for political campaigns.

Section 2. Expands the definition of a political organization to include political parties. Current definitions limit "political organizations" to organizations or clubs organized for or formally affiliated with a political party. This expansion will cover all political and quasi-political organizations and supplement the effect of **Section 1.**

FISCAL NOTE

STATE OF ALASKA
1994 LEGISLATIVE SESSION

BILL NO. HB 308

Revision Date:		Dept. Affected:	Revenue
Title:	"An Act prohibiting the direct or indirect contribution or payment of net proceeds of a bingo or pull-tab game to candidates for public office; and relating ...	BRU:	Revenue Operations
		Component:	Charitable Gaming
Sponsor:	Representative Therriault		
Requestor:	House Labor and Commerce	COMPONENT SERIAL NO.	1883

Expenditures/Revenues: (Thousands of Dollars)

OPERATING	FY95	FY96	FY97	FY98	FY99	FY00
PERSONAL SERVICES						
TRAVEL						
CONTRACTUAL						
SUPPLIES						
EQUIPMENT						
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	0.0	0.0	0.0	0.0	0.0	0.0
CAPITAL						
REVENUE FUND SOURCE:						

FUNDING: (Thousands of Dollars)

1002 Federal Receipts						
1003 GF Match						
1004 GF						
1005 GF/Program Receipts						
1006 GF/MHTIA						
Other						
TOTAL	0.0	0.0	0.0	0.0	0.0	0.0

POSITIONS:

FULL-TIME						
PART-TIME						
TEMPORARY						

Estimate of current year (FY94) impact: $ 0.0

ANALYSIS: (Attach a separate page if necessary.)

No fiscal impact.

Prepared by: Don Stolworthy, Director [signature] for — Phone: 465-2279
Division: Charitable Gaming Division — Date: 01/13/94
Approved by Commissioner: Darrel J. Rexwinkel [signature] — Date: 1/14/94
Agency: Department of Revenue

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Department of Revenue
Position Paper

****

HB-308 "An Act prohibiting the direct or indirect contribution or payment of the net proceeds of a bingo or pull-tab game to candidates for public office; and relating to the definition of 'political organization' as that term is used in the laws relating to charitable gaming."

****

This bill would prohibit Gaming proceeds derived from pull-tabs and bingo activities from being used as direct or indirect campaign contributions. Candidates could continue to raise campaign funds through more traditional forms of fund raising such as raffles. Similar measures were contained last year in HB 168 but were removed prior to final passage of that comprehensive reform legislation.

The department supports this measure and believes it is appropriate to insure public confidence in our elected public officials and proper use of charitable gaming proceeds.

Date 1/14/94

Darrel J. Rexwinkel
Commissioner

ALASKA GAMING AT A GLANCE

Basic qualifications for a Games of Chance and Skill permit

Municipalities
Non-Profit organizations with 25 or more members and that have been in existence in Alaska for 3 or more years

Categories of Organizations

Charitable
Civic or Service
Dog Musher's Association
Educational
Fishing Derby Association
Fraternal
Labor
Municipality
Non-Profit Trade Association
Outboard Motor Association
Police or Fire Department and Company
Political
Religious
Veterans

Types of games authorized in Alaska

Amusement devices
Bingo, pull-tabs, raffles, ice classics, fish derbies
Games of skill (archery, sports, etc.)
Monte Carlo events (no cash prizes)

Types of games which are illegal in Alaska

Slot machines
Banking card games (poker, blackjack, etc.)
Video poker, video pull-tabs
Roulette
Sports pools, numbers
Pari-mutuel racing

Prepared by:
Department of Revenue
Charitable Gaming Division
February 1994

ALASKA GAMING AT A GLANCE

Charitable Gaming Division
Financial Statistics for Calendar Year 1992

Organization Type	Gross Receipts	Net Proceeds	Percentage of Total Net Proceeds
Charitable	36,968,411	3,024,859	17.2%
Civic or Service	60,853,367	4,338,776	24.7%
Dog Musher's	6,438,093	236,974	1.3%
Educational	29,124,930	2,436,396	13.9%
Fishing Derby Association	886,275	100,492	.6%
Fraternal	23,615,065	1,773,778	10.1%
Labor	4,498,989	126,427	.7%
Municipalities	10,507,042	1,432,871	8.2%
Non-Profit Trade Association	16,237,955	1,321,030	7.5%
Outboard Motor Association	52,816	5,600	0%
Police or Fire Department	7,360,626	862,732	4.9%
Political	3,416,617	239,381	1.4%
Religious	3,512,469	425,103	2.4%
Veterans	15,387,115	1,252,311	7.1%
Totals	218,859,770	17,576,730	100.0%

Prepared by:
Department of Revenue
Charitable Gaming Division
March 1994

HB

309

Sectional Analysis
House Bill 309

Section 1. Amends AS 19.40.200(b)(1)to exclude licensed public utilities from the current prohibition on disposal of state land within five miles of the right-of-way of the Dalton Highway under AS 38.05.810(e).

Sectional Analysis
Committee Substitute for House Bill 309

Section 1. Amends AS 19.40.200(b)(1) to exclude licensed public utilities from the current prohibition on disposal of state land within five miles of the right-of-way of the Dalton Highway under AS 38.05.810(e).

Page 1, Line 13 - Allows disposal of land for non-residential development at specific locations.

Page 2, Line 30- Allows for disposal of state land and materials necessary for reconstruction and maintenance of state highways and construction or maintenance of airports.

Alaska State Legislature

REPRESENTATIVE
GENE THERRIAULT
P.O. Box 55326
North Pole, Alaska 99705
(907) 488-0862

House District 33

While in Juneau
State Capitol
Juneau, Alaska
99801-1182
(907) 465-4797

House Of Representatives

HB 309: "An Act relating to disposals of state land within five miles of the right-of-way of the Dalton Highway to a licensed public utility or a licensed common carrier."

Sponsor: Representative Gene Therriault

Sponsor Statement:

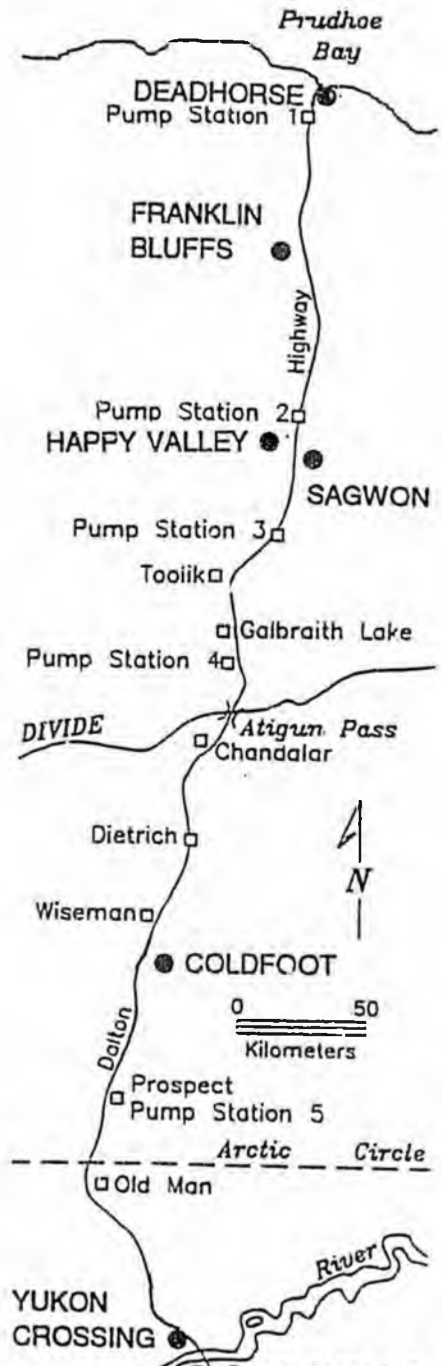
This legislation seeks to address a problem recently brought to my attention concerning land disposals along the Dalton Highway. State statutes currently prohibit disposing of state land within five miles of the right-of-way of the Dalton Highway for anything other than oil and gas leases or for oil and gas exploration, development, production or transportation north of 68 degrees north latitude. Also prohibited are materials sales for anything other than oil and gas related activities or for reconstruction or maintenance of the highway north of 68 degrees north latitude. The prohibition prevents a private telephone company, which is seeking land in order to expand services to Coldfoot, from obtaining the necessary acreage. This legislation would solve the problem and authorize the Department of Natural Resources to dispose of land to a licensed public utility or a licensed common carrier.

After proposing legislation to address the communications issue, I was made aware of larger problems concerning leases within the entire Dalton Highway corridor, which affect both the DNR and the Department of Transportation and Public Facilities. Since August, 1992, more than 650,000 acres of land at selected sites along the corridor have been transferred to the state from BLM. The land selections encompass several existing BLM leases. Because DNR does not have the authority to renew these leases taken over from the federal government, the state's ability to manage the land in the future is at jeopardy. DNR is also prohibited from removing or disposing of gravel, which is required for improving the airport at Deadhorse.

Also affected is the Department of Transportation and Public Facilities, which recommends that the bill be amended to allow disposal of state land and materials for construction, improvement and maintenance of public facilities. Such an amendment would facilitate work on corridor airports, service roads, access roads and waysides, as well as the entire length of the Dalton Highway.

In response, I have respectfully submitted a sponsor substitute that would allow for nonresidential development within "development nodes" such as Coldfoot and Happy Valley. It would also allow for land and materials disposal for reconstruction or maintenance of state highways and construction or maintenance of airports.

I urge your favorable vote on this very important legislation. Thank you.


Prudhoe Bay
DEADHORSE
Pump Station 1
FRANKLIN BLUFFS
Highway
Pump Station 2
HAPPY VALLEY
SAGWON
Pump Station 3
Toolik
Galbraith Lake
Pump Station 4
DIVIDE
Atigun Pass
Chandalar
Dietrich
N
Wiseman
COLDFOOT
0
50
Kilometers
Dalton
Prospect
Pump Station 5
Arctic Circle
Old Man
River
YUKON CROSSING
Pump Station 6
Yukon
Livengood

DIVISION OF LAND

NORTHERN REGION

Dalton Highway and North Slope Lease Tracts

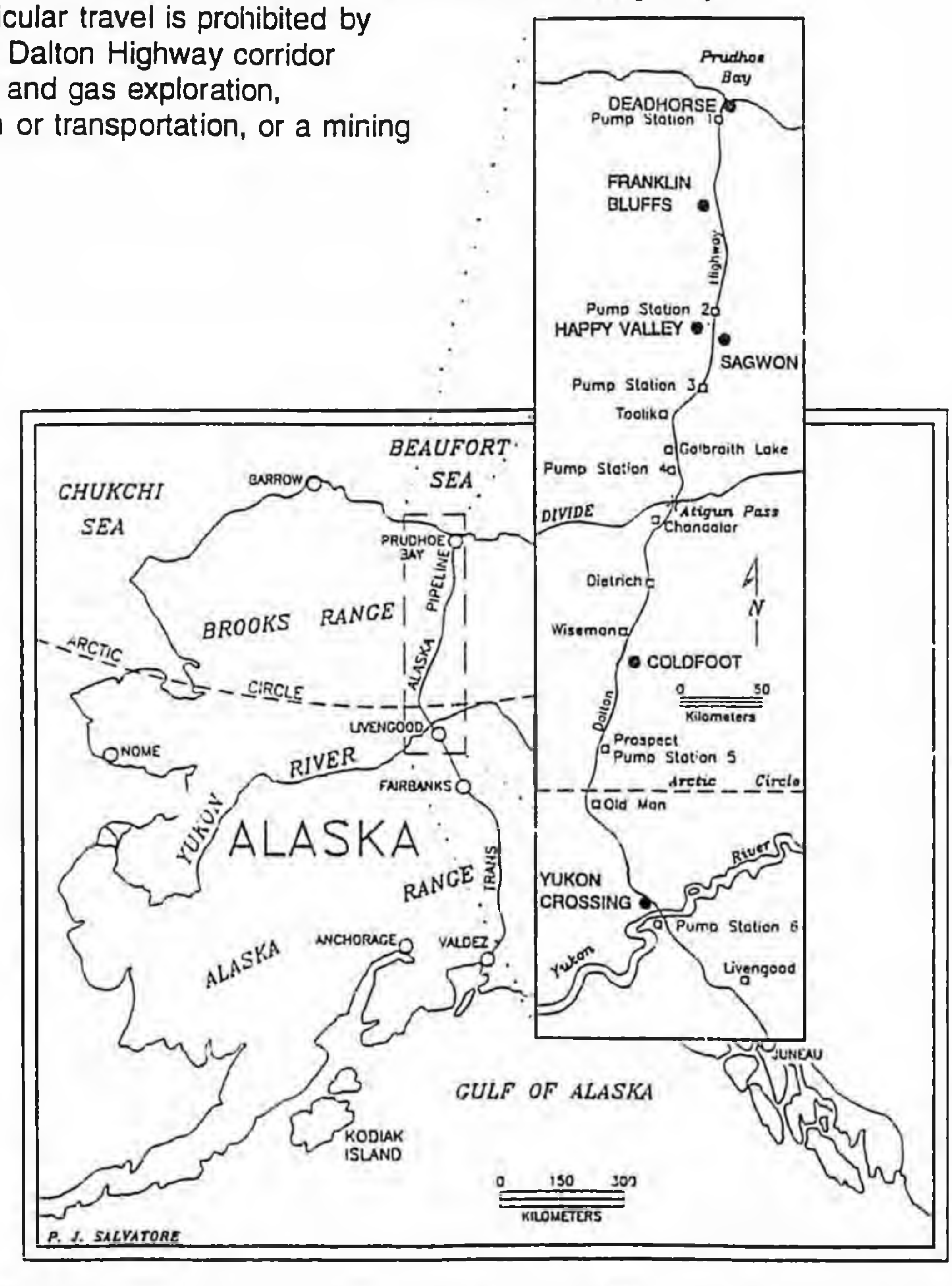
More than 650,000 acres of land at selected sites along the Trans-Alaska Pipeline corridor have been transferred from BLM to the state since August 1992. The land was transferred to the state under provisions of the Statehood Act.

At the present time, AS 19.40.200 prohibits the state from disposing of state land (leases and material sales) lying within 5 miles of the Dalton Highway, under AS 38. The statute does allow for a few exceptions: 1) oil and gas leasing, 2) exploration, development, production or transportation of oil and gas, and 3) a state lease or materials sale for activities listed in 1 and 2 and maintenance of the highway. In addition, off-road vehicular travel is prohibited by AS 19.40.210 within the Dalton Highway corridor unless it is related to oil and gas exploration, development, production or transportation, or a mining activity.

DALTON HIGHWAY

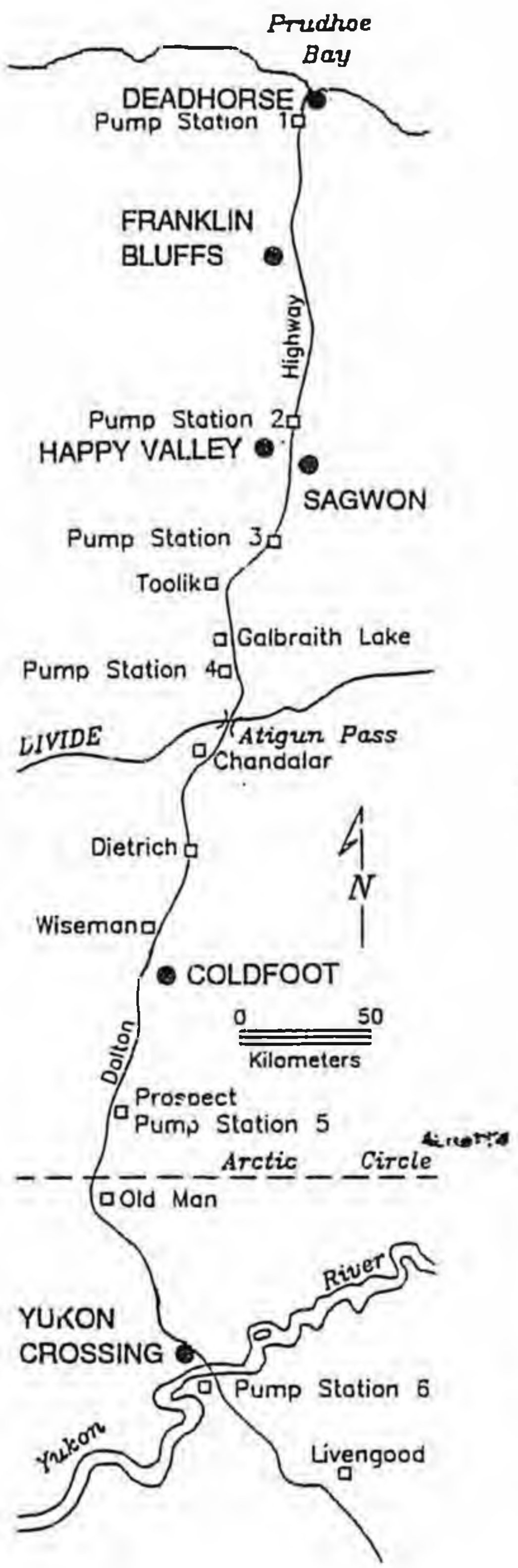
DEVELOPMENT NODES
Proposed in HB309:

Coldfoot
Deadhorse
Franklin Bluffs
Happy Valley
[redacted]
Yukon Crossing



COLDFOOT

Coldfoot Services Lease This 33 acre lease is located on the Dalton Highway approximately midway between Fairbanks and Prudhoe Bay. This site is used as a truck stop, motel, cafe, and garage. According to the lease agreement, the lessee, Petro Star Inc., must provide the following services: fuel, emergency road service, emergency lodging, and food. This lease was originally issued by the Bureau of Land Management before the land was transferred to the state. This site cannot be expanded and other leases cannot be issued due to the prohibition in AS 19.40.200.



HAPPY VALLEY

The Happy Valley pad was created by Alyeska during the construction of the Trans-Alaska Pipeline for a construction camp and airstrip. Prior to state receiving title, as many as 15 permits plus a BLM administrative cabin were located on this site. Ten active BLM authorizations were transferred to the state. Eight of these were associated with big game guide operations and the remaining two sites were staging areas for the Departments of Fish & Game and Public Safety (Fish & Wildlife Protection). All but two of the guide authorizations expired on December 31, 1993. These and other operators are interested in future authorizations for use of the site. The guides have expressed concern that if the municipal entitlement selection is granted to the borough, no permits would be allowed for big game guides. Until the municipal entitlement application is adjudicated, the division will issue one-year permits to authorize guide sites at Happy Valley.

FRANKLIN BLUFFS

Western Geophysical Company has been issued a 10 year negotiated lease effective August 1, 1987. This lease supports of oil and gas activities on the North Slope.

Additionally, the Northern Region issues one-year land use permits to oil field service companies to use the Franklin Bluffs pad for equipment staging. For instance, Unocal was issued a permit on November 30, 1993 to use a portion of the pad to support the Amethyst exploration project.

DEADHORSE

North Slope Borough Landfill The current Oxbow Landfill is near capacity. The NSB has identified another landfill location south of Deadhorse near the airport. The NSB has been operating the existing Oxbow Landfill since the early 1980's. This landfill may contain many toxic and hazardous materials used at Prudhoe Bay. The NSB originally applied to lease this site; however, a lease was not issued. Since this site was included in the NSB Municipal Entitlement applications, the entitlement was adjudicated and a patent presented to the borough. This patent was rejected by the NSB, presumably due to the liability of owning a landfill with hazardous materials. The Department believes the NSB is still liable for any hazardous materials that may have been placed in the landfill. While the Department is supportive of the proposed landfill, it will require the borough to have ownership of the site prior to operating the new landfill to limit the state's liability. The Department of Environmental Conservation is presently reviewing the close-out plan for the Oxbow Landfill and is also reviewing the operations plan for the proposed landfill. The new landfill may not be authorized due to the prohibition in AS 19.40.200 unless the borough selects the site as part of its municipal entitlement.

Deadhorse Airport Improvements An application for a 500,000 cubic yard material sale under AS 38.05.810 was received on February 9, 1993 from the Department of Transportation and Public Facilities. The purpose of the material sale was to repair and make improvements to the airport at Deadhorse. The proposed material site is located two miles south of the airport on the west side of the Dalton Highway. During an interagency meeting with the North Slope Borough, the option was discussed to co-locate the material site with the new landfill. At the present time, this material sale can not be issued because of the prohibition in AS 19.40.200. The Division of Land, in consultation with the Department of Transportation and its Assistant Attorney General, have concluded that further action regarding the material sale must be suspended until the statute is amended to allow this activity to occur.

Service Company (North Slope) Leases The Northern Region has 62 service company lessees occupying 70 lease tracts at Deadhorse. These 62 lessees pay lease rentals that total $227,515 per year. Thirty four of these leases have a history of chronic pollution and contamination. The Northern Region staff are working with these lessees, oil and gas production companies, the Prudhoe Bay Environmental Alliance (PBEA), and the Department of Environmental Conservation to remediate these tracts.

- 34 leases are **voluntarily complying with clean up requirements:**
  18 completed cleanups within the last four years, and
  16 are in the process of cleanup.

- 8 leases have been **terminated for failure to comply** with the lease terms and conditions.

- **16,800 tons of scrap metal have been removed** from these leases over the past three years and backhauled to the lower 48. **7,000 additional tons**, including two old drill rigs, were removed in 1993. This is equivalent to 300 large truck loads. This backhaul was coordinated by the oil and gas industry and the PBEA.

- **41,250 gallons of toxic or hazardous wastes have been removed** to date from these leases and transported to hazardous waste disposal sites in the Lower 48.

Lease Administration The Northern Region has recently augmented its role in the management of north slope lease tracts by assuming the contract administration duties associated with the leases. This function was previously administered in Anchorage. In addition to field compliance work, the resource officers staff issue, (re)assign and terminate the leases. While these additional duties will consume a substantial portion of the staff's time, it is believed that it will increase efficiency and add continuity to the administration of the lease tracts and better serve the public and lessees.

Clean-up Methods The North Slope has been the proving grounds for a variety of new site remediation technology for contaminated land in Alaska.

- In-situ bioremediation, using applications of fertilizer and tilling to aerate
- In-situ bioremediation, using air sparging
- Ex-situ bioremediation (Soil and gravel are placed on a liner to allow soil temperatures to increase more rapidly. Otherwise, soil and gravel are managed in similar fashion as in-situ bioremediation.)
- Thermal remediation
- Soil washing with steam

Department of Transportation
and Public Facilities

POSITION PAPER

BILL NO: **HB 309**

APPROVED: for B.A. Campbell

TITLE: **Disposal of Dalton Hwy Right-Of-Way Land**

DATE: **February 14, 1994**

The Department of Transportation and Public Facilities (DOT&PF) supports amendment of AS 19.40.200 to allow disposal of state land within five miles of the Dalton Highway right of way for the purpose of establishing public utility systems.

DOT&PF recommends that AS 19.40.200 also be amended to allow disposal of state land and materials for construction, improvement and maintenance of public facilities. Such an amendment would facilitate work on corridor airports, service roads, access roads and waysides, as well as the entire length of the Dalton Highway.

For Further Information contact J.K. Ginger Johnson at 465-3904.

WALTER J. HICKEL, GOVERNOR

DEPARTMENT OF NATURAL RESOURCES

OFFICE OF THE COMMISSIONER

400 WILLOUGHBY AVENUE
JUNEAU, ALASKA 99801-1796
PHONE: (907) 465-2400
FAX: (907) 465-3886

February 8, 1994

The Honorable Gene Therriault
Alaska State House of Representatives
State Capitol (MS 3100)
Juneau, Alaska 99801-1182

Dear Representative Therriault:

We fully support House Bill 309 which authorizes the Department of Natural Resources to dispose of state land within five miles of the right-of-way of the Dalton Highway to a licensed public utility or a licensed common carrier. This is needed to allow for the construction and operation of such things as pipelines, electric and telephone lines. These uses are currently prohibited under AS 19.40.200.

We would also recommend that the statute be further amended to authorize the Department to dispose of land for industrial and commercial uses within the identified development nodes at Coldfoot, Happy Valley, Franklin Bluffs, Yukon Crossing and Deadhorse. In the last year, land at these locations has been conveyed to the state. We are prohibited from issuing leases or permits, for even the existing facilities, at these locations. In addition, we are prohibited from removing or disposing of gravel. There is currently a need for gravel at Deadhorse for airport improvement that we are unable to provide.

Please feel free to contact me or Ron Swanson, Director, Division of Land, if you have any question or need additional information.

Sincerely,

Harry A. Noah
Commissioner

HAN/sf

cc: Commissioner Bruce Campbell, DOT/PF
Ron Swanson, Director, Div. of Land
Jerry Gallagher, Legislative Liaison, DNR
Raga Elim, Legislative Liaison, Office of the Governor

STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF LAND
3700 AIRPORT WAY
FAIRBANKS, ALASKA 99709

FACSIMILE COVER SHEET

January 18, 1994 4:30 pm

DELIVER TO: **Ron Swanson, Director, Division of Land**
c/o Sharon Fremming, Commissioner's Office

TELECOPIER NUMBER: **465-3886**

TOTAL NO. PAGES (incl. this page): 8

FROM: **Nancy Welch**
Natural Resource Manager
Operations Section

PHONE: **907-451-2734** FAX: **907-451-2751**

RE: **Dalton Highway information**

COMMENTS: **Ron - Here's info that you requested. It's in a rough form; if you would like it in a report format we can redo. Let me know. Sorry that I missed getting this to you while your were still in Anchorage.**

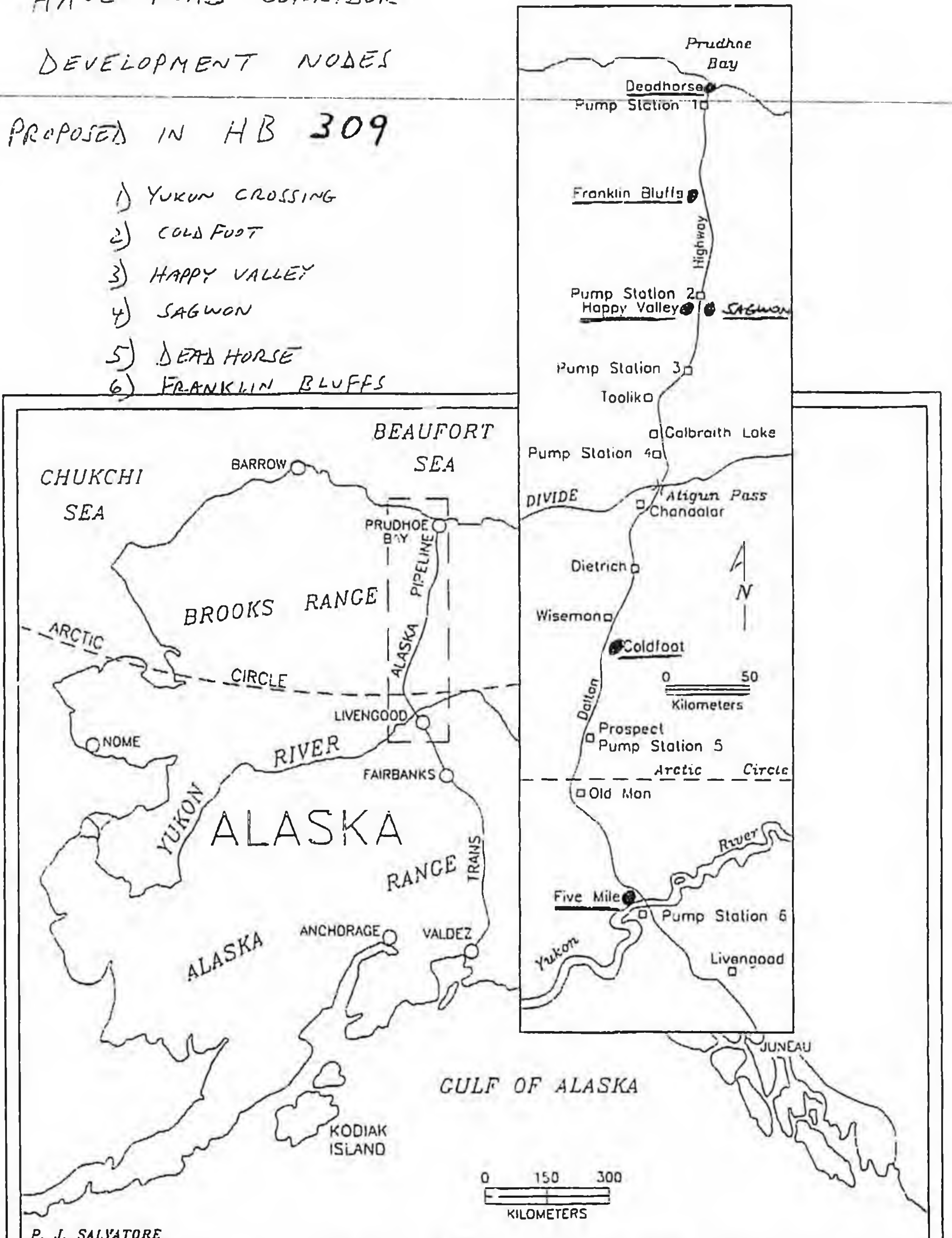
Wilda
Whitaker

HAUL ROAD CORRIDOR

DEVELOPMENT NODES

PROPOSED IN HB 309

1) YUKON CROSSING
2) COLD FOOT
3) HAPPY VALLEY
4) SAGWON
5) DEAD HORSE
6) FRANKLIN BLUFFS

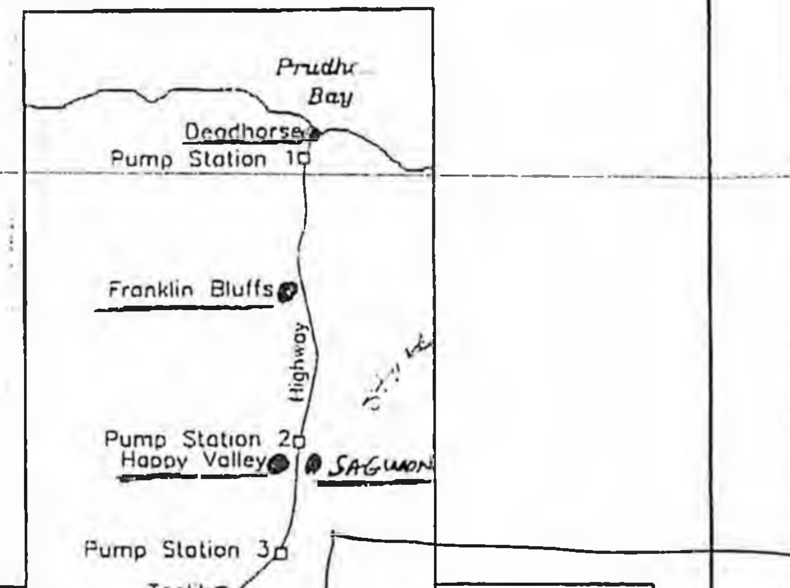


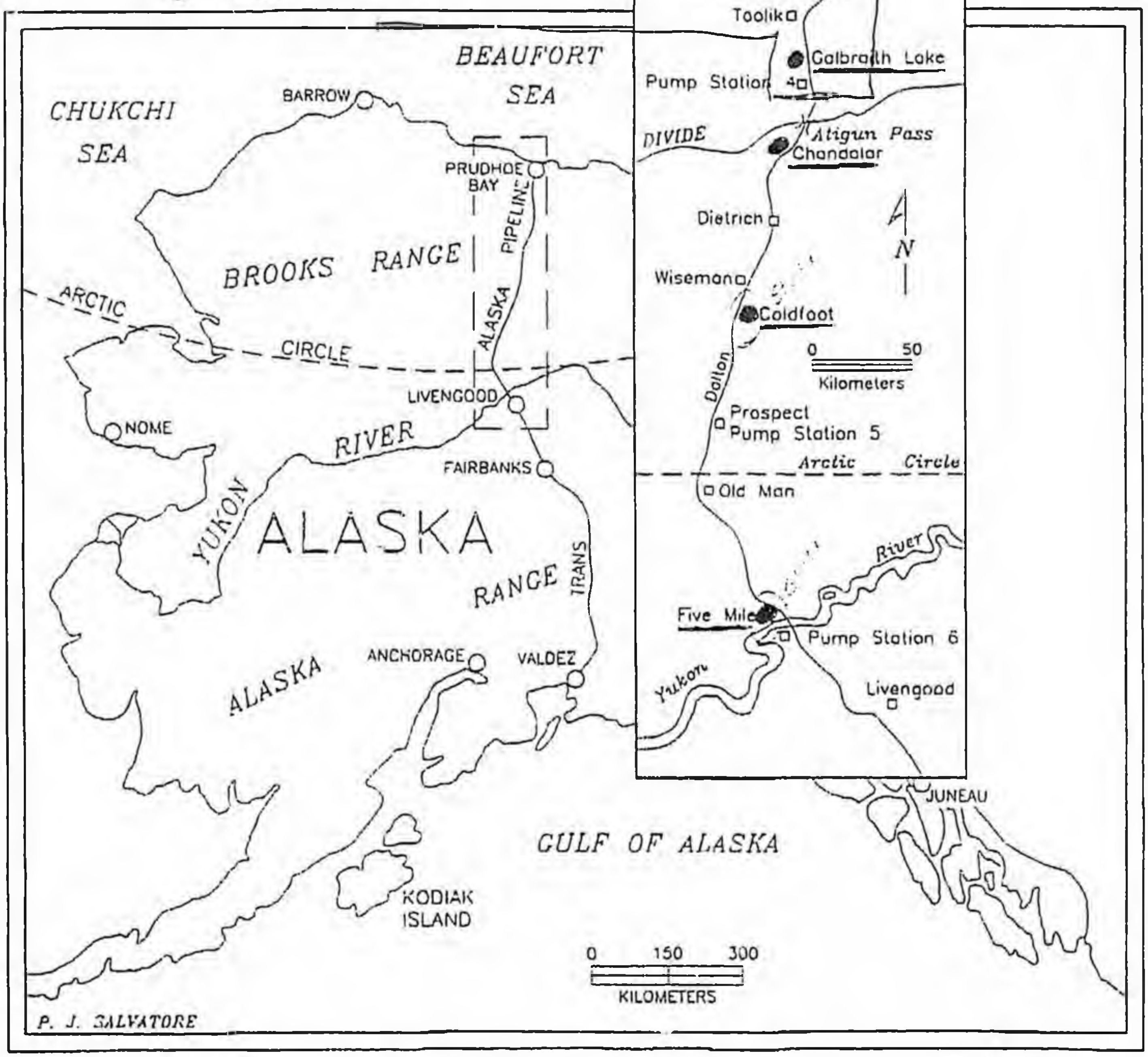
HAUL ROAD CORRIDOR

DEVELOPMENT NODES

PREFERRED BY NORTHERN REGION

1) YUKON CROSSING
2) COLDFOOT
3) CHANDALAR
4) GALBRAITH LAKE
5) HAPPY VALLEY
6) SAGWON
7) FRANKLIN BLUFFS
8) DEADHORSE





Material Sales

Department of Transportation and Public Facilities - AS 38.05.810

Highway Mtnc.

	ADL No.		
Deadhorse Airport	414988	500,000 c.y.	Application Received
MP 318	415237	75,000 c.y.	Application Received
MP 314	415233	25,000 c.y.	Application Received
MP 310	415234	25,000 c.y.	Application Received
MP 311	415232	25,000 c.y.	Application Received
MP 306	415236	50,000 c.y.	Application Received
MP 323.5	415229	25,000 c.y.	Application Received
Happy Valley	415230	150,000 c.y.	Application Received
MP 340.5	415231	40,000 c.y.	Application Received
Coldfoot - Slate Creek	414911	100,000 c.y.	Contract Issued
Coldfoot - Emma Creek	414910	100,000 c.y.	Contract Issued
Happy Valley Camp	414761	150,000 c.y.	Contract Issued
UM, T2S, R14E	414760	200,000 c.y.	Contract Issued
UM, T3S, R14E	414763	75,000 c.y.	Contract Issued
UM, T1N, R14E	413790	100,000 c.y.	Contract Issued
UM, T2N, R14E	407665	150,000 c.y.	Contract Issued
UM, T3N, R14E	403083	30,000 c.y.	Contract Issued
UM, T5N, R14E	403090	30,000 c.y.	Contract Issued
UM, T7N, R14E	403087	250,000 c.y.	Contract Issued

FRANKLIN BLUFFS

ADL 412378, Western Geophysical Company, has been issued a 10 year negotiated lease effective 8-1-87. This is allowed under the current statute since it is in support of oil and gas activities on the North Slope.

Additionally, one-year permits are issued to other service companies for staging areas. For instance, Unocal was issued a permit on November 30, 1993 to use a portion of the pad for a staging area in support of the Amethyst exploration project.

COLDFOOT
(Map attached)

Coldfoot Services Lease - F-79340 - Parcel D

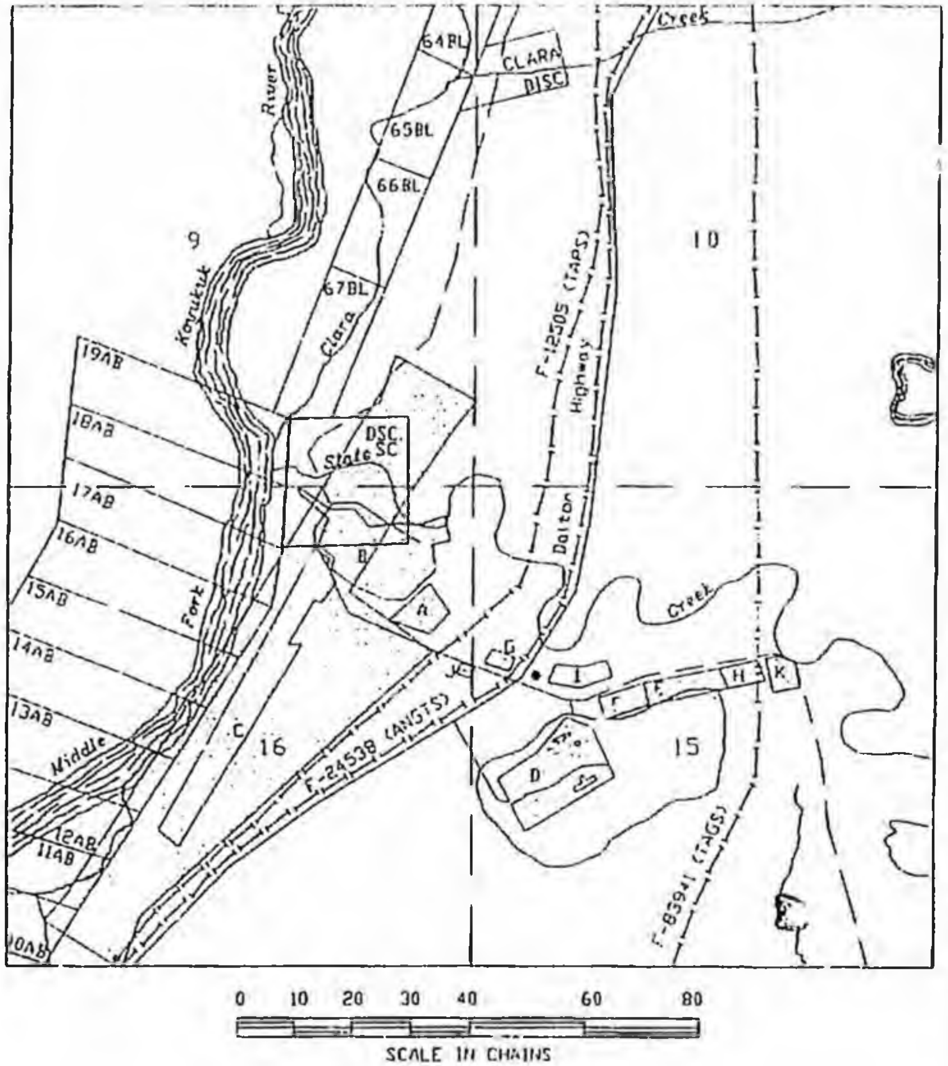
This 33 acre lease is located on the Dalton Highway approximately midway between Fairbanks and Prudhoe Bay. This site is used as a truck stop, motel, cafe, and garage. According to the lease agreement, the lessee, Petro Star Inc., must provide the following services: fuel, emergency road service, emergency lodging, and food. This lease was originally issued by the Bureau of Land Management before the land was transferred to the state. Under existing state law, this site cannot be expanded, and other leases to competitors cannot be issued.

Federal Rights-of-Way and Permits

The tentative approval granted to the state also included the transfer of 5 sites to be managed by the State of Alaska:

Parcel A	F-38789	A permit to DOT/PF for a maintenance camp. This camp is now within an ILMA to the DOT/PF.
Parcel	F-80107	A permit to DOT/PF for a stockpile area. This site is now within an ILMA to DOT/PF
Parcel K	F-86549	A permit to the ational Park Service for employee housing
Parcel F	F-80873-B	A permit to BLM; this site is within the ILMA to DOT/PF
Parcel H	F-81271-A	A permit to the ational Park Service for employee housing

COLDFOOT ALASKA T. 28 N., R. 12 W. FAIRBANKS MERIDIAN



SECTION LINE	— — —	ROADS	———
SNOW SURVEY SITE	●	TRAILS	— — —
RIVERS/STREAMS	~~~	PIPELINE	
DOT AIRSTRIP F-84553	▭	PIPELINE	NOT CONSTRUCTED
USE AUTHORIZATIONS	▭		

A	F-38789	R/W FHWA		~~B~~	~~F-40546~~	~~FLP TUP~~	
~~G~~	~~F-79244~~	~~FLP TUP~~		D	F-79340	FLPMA LEASE	
C	F-80107	R/W FHWA		F	F-80873B	R/W BLM	
~~E~~	~~F-80873C~~	~~R/W BLM~~		H	F-81271A	R/W NPS	
~~I~~	~~F-81271B~~	~~R/W NPS~~		~~J~~	~~F-86E40~~	~~FLPMA PERMIT~~	
K	F-86549	R/W NPS					

FEDERAL MINING CLAIMS ▭

	CLAIM NAME	BLM SERIAL NUMBER
64BL	64 BELOW	F-57154
65BL	65 BELOW	F-57155
66BL	66 BELOW	F-57156
67BL	67 BELOW	F-57157
CLARA DISC	CLARA DISCOVERY	F-57168
DISC SC	DISCOVERY SLATE CREEK	F-63334
10AB	10 ABOVE	F-63347
11AB	11 ABOVE	F-63348
12AB	12 ABOVE	F-63349
13AB	13 ABOVE	F-63350
14AB	14 ABOVE	F-63351
15AB	15 ABOVE	F-63352
16AB	16 ABOVE	F-63353
17AB	17 ABOVE	F-63354
18AB	18 ABOVE	F-63355
19AB	19 ABOVE	F-63356

CURRENT AS OF AUGUST 31, 1989

MAP COMPILATION F.J. SALVATORE

HAPPY VALLEY - PRESENT STATUS OF PERMITS:

F-85320
Len Mackler , Guide Camp
expires December 31, 1993
improvements on site, site active

F-85769
John Merril, Guide Camp
expires December 31, 1993
improvements on site, site active

F-88307
Gary Dobson
applied to BLM for Merrils site but permit was never issued

F-84273
Alaska Fish and Wildlife Protection , Base camp
expires December 31, 1993
improvements on site, site active

F-81444
Alaska Department of Fish and Game, Base Camp
expires December 31, 1992
improvements on site, site active

F-86036
Dave Gratias
to expire December 31, 1992
relinquished in summer, 1992
site was taken over by Taiga Ventures

F-88248
Taiga Ventures, Exploration support base camp
expires
improvements on site, site active

F-85913
~~Dan Holleman/Don Troutman , Guide Camp~~
expires December 31, 1993
improvements on site, site not active

F-86923
a right-of-way permit which BLM intends to close
no improvements on site - site is clean except for a revetment frame

F-86665
Wyn Reeves
closed by BLM on December 31, 1992
(site was used for a personal hunting camp)

F-88173
Stan Parker/Gary Thomas , Guide Camp
permit was proposed to be issued on the former Wyn Reeves site (F-86665) but was not finalized - last contact between BLM and applicants is dated July 29, 1992

F-86002
Kurt Lepping , Guide Camp
expires December 31, 1993
site is empty

F-866664
Dan Scott Guide Camp
expired December 31, 1993
site is empty, apparently site has not been used for two years

F-84762 (base camp) Guide Camp
Nancy Neel
expires December 31, 1994
improvements on site, site active

F-86048 (horse corral)
Nancy Neel
expires December 31, 1994
improvements on site, site active

LAS# 14027
Dave Neel
Pending application for Guide Camp
Mile 40, Dalton Highway

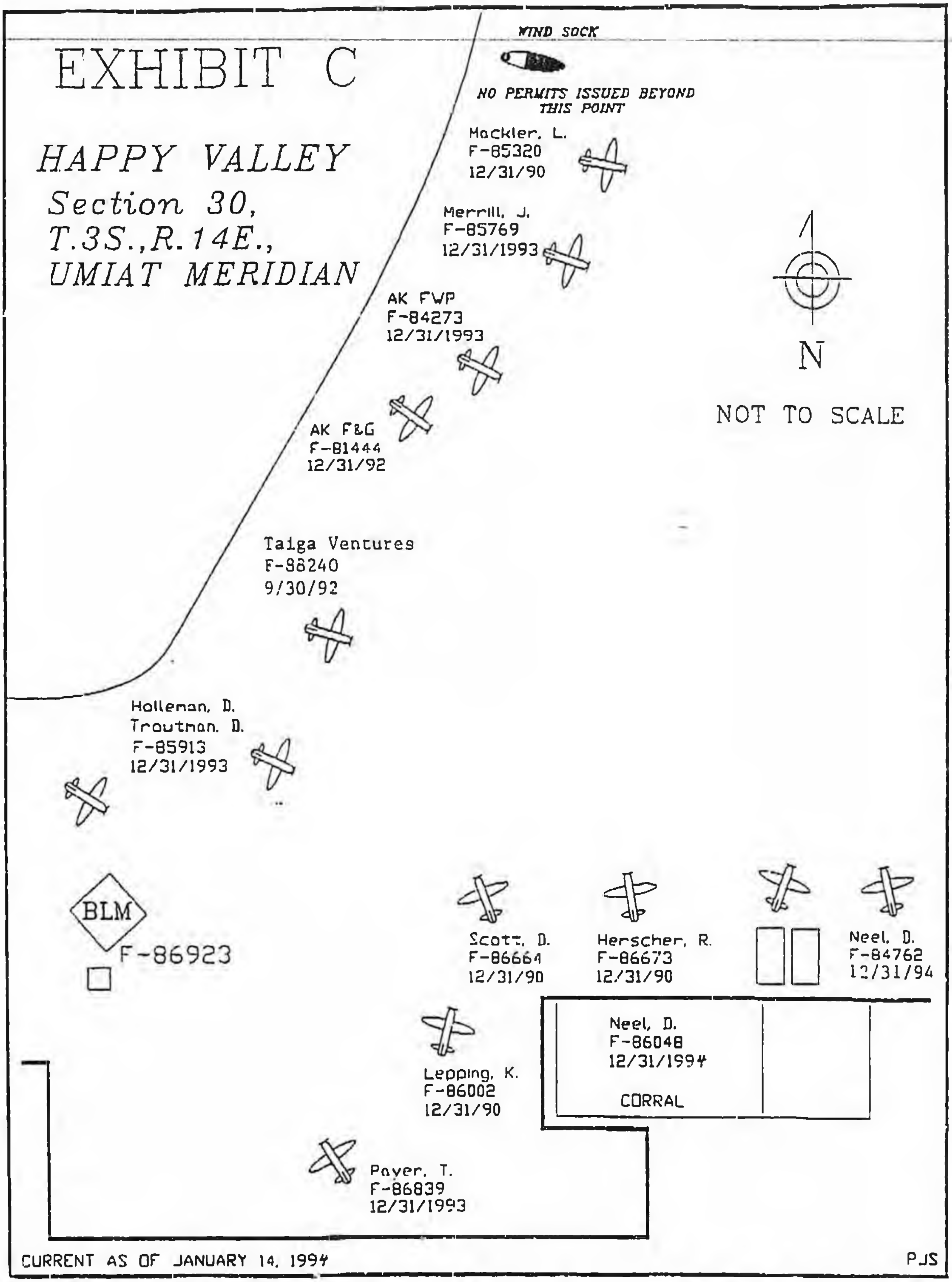


EXHIBIT C
HAPPY VALLEY
Section 30,
T.3S.,R.14E.,
UMIAT MERIDIAN
WIND SOCK
NO PERMITS ISSUED BEYOND THIS POINT
Mackler, L.
F-85320
12/31/90
Merrill, J.
F-85769
12/31/1993
AK FWP
F-84273
12/31/1993
N
NOT TO SCALE
AK F&G
F-81444
12/31/92
Taiga Ventures
F-86240
9/30/92
Holleman, D.
Troutman, D.
F-85913
12/31/1993
BLM
F-86923
Scott, D.
F-86664
12/31/90
Herscher, R.
F-86673
12/31/90
Neel, D.
F-84762
12/31/94
Neel, D.
F-86048
12/31/1994
CORRAL
Lepping, K.
F-86002
12/31/90
Payer, T.
F-86839
12/31/1993
CURRENT AS OF JANUARY 14, 1994
PJS

DEADHORSE AIRPORT IMPROVEMENTS

An application for a 500,000 cubic yard material sale under AS 38.05.810 was received on February 9, 1993 from the Department of Transportation and Public Facilities. The purpose of the material sale was to repair and make improvements to the airport at Deadhorse.

The material site is a new pit location and is located two miles south of the airport on the west side of the Dalton Highway. During an interagency meeting with the North Slope Borough, the option was discussed to coordinate the pit location with the future location of the North Slope Borough Service Area 10's new landfill.

Unfortunately, discussions came to a halt when the Division of Land reviewed the statute governing the Dalton Highway. AS 19.40.200 states in part, that "The state may not dispose of state land under AS 38 which is within five miles of the right-of-way of the highway." The statute allows a few exceptions to this prohibition: 1) oil and gas leasing, 2) exploration, development, production or transportation of oil and gas, and 3) a state lease or materials sale for activities listed in 1 and 2 and **maintenance of the highway.** No provision has been made for materials sale not associated with the highway, such as the Deadhorse airport.

The Division of Land, in consultation with the Department of Transportation and its Assistant Attorney General, have concluded that the material sale must be suspended until the statute is amended to allow this activity to occur.