INTRODUCTION

Critical issues concerning truck sizes and weights were brought to light with the enactment of the Federal Aid Highway Act of 1956(7). This Act established the maximum weight limits for the Interstate System, which were 18,000 lbs. on a single axle, 32,000 lbs. on a tandem axle, and 73,280 lbs. gross vehicle weight. In addition, a "grandfather clause" was included to protect those states which already permit loads in excess of those specified in the Act. Table 1 shows the twenty-five states that qualified to retain higher limits under the clause.

Prompted by the 1973 energy crisis, the Federal Aid Highway Act of 1974 raised the federal weight limits to 20,000 lbs. on single axles, 34,000 lbs. on tandem axles, and 80,000 lbs. gross weight. At the present time, there are nine* states, in addition to the state of Indiana, that maintain the original 1956 weight limits. Most of these states, known as the "barrier states," lie in the midwestern part of the United States (see Figure 1).

Truck lengths also vary among the states, even though there is no federal legislation concerning length or truck type on the Interstate System (Figure 2). At the present time, the 55 ft. tractor-semitrailer combinations (i.e., 2-S1, 2-S2, 3-S1, 3-S2) are the only types of combination vehicles permitted in every state. However, it is important to note that most of the western states permit tractor-semitrailer combinations of 60 feet or more.

EFFECT OF TRUCK WEIGHT ON PAVEMENT LIFE

Diversities in size and weight limits among the states result in the inefficient use of the state highway system for the movement of goods. The question is often asked, "Why have those restrictive states, in-

*Recently Iowa, Connecticut, Delaware, and Maryland increased their weight limits to those specified by the Federal Highway Act of 1974.
Table 1. Grandfather Clause Applications on Interstate System*

<table>
<thead>
<tr>
<th>State</th>
<th>Single axle weight limits (lbs.)</th>
<th>Tandem axle weight limit (lbs.)</th>
<th>Gross vehicle weight limit (lbs.)</th>
<th>Width (1) (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federal Limit</td>
<td>20,000</td>
<td>34,000</td>
<td>80,000</td>
<td>96</td>
</tr>
<tr>
<td>weight or width permitted on Interstate highways</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Alabama</td>
<td>36,000(2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Colorado</td>
<td>36,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Connecticut</td>
<td>22,400(2)</td>
<td>36,000(2)</td>
<td></td>
<td>102</td>
</tr>
<tr>
<td>4. Delaware</td>
<td>36,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. District of Columbia</td>
<td>21,000(2)</td>
<td>37,000(2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Florida</td>
<td>22,000(3)</td>
<td>40,000(2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Georgia</td>
<td>20,340(3)</td>
<td>36,000(2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Idaho</td>
<td></td>
<td></td>
<td>105,500(4)</td>
<td></td>
</tr>
<tr>
<td>9. Maine</td>
<td>22,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Maryland</td>
<td>22,400(2)</td>
<td>40,000(2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Massachusetts</td>
<td>22,400(5)</td>
<td>36,000(5)</td>
<td>99,000(4)</td>
<td></td>
</tr>
<tr>
<td>12. Montana</td>
<td></td>
<td></td>
<td>105,500(4)</td>
<td></td>
</tr>
<tr>
<td>13. Nebraska</td>
<td></td>
<td></td>
<td>95,000(4)</td>
<td></td>
</tr>
<tr>
<td>14. New Hampshire</td>
<td>22,400</td>
<td>36,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. New Jersey</td>
<td>22,400</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. New Mexico</td>
<td>21,600</td>
<td>34,320</td>
<td>86,400</td>
<td></td>
</tr>
<tr>
<td>17. New York</td>
<td>22,400</td>
<td>36,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. North Carolina</td>
<td>36,000(2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. Oregon</td>
<td></td>
<td></td>
<td>105,500(4)</td>
<td></td>
</tr>
<tr>
<td>20. Pennsylvania</td>
<td>22,400(2)</td>
<td>36,000(2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21. Rhode Island</td>
<td>22,400</td>
<td>36,000</td>
<td></td>
<td>102</td>
</tr>
<tr>
<td>22. Utah</td>
<td></td>
<td></td>
<td>105,500(4)</td>
<td></td>
</tr>
<tr>
<td>23. Vermont</td>
<td>22,400</td>
<td>36,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24. Washington</td>
<td></td>
<td></td>
<td>105,500(4)</td>
<td></td>
</tr>
<tr>
<td>25. Wyoming</td>
<td>36,000</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(1) Width limit exceptions are noted only for those states allowing the body of the vehicle to extent beyond 96". Several additional states allow widths beyond 96" for such things as extremes of pneumatic tires, mirrors and other safety devices, and/or loads.

(2) Does not include statuatory tolerance.

(3) Includes tolerance.

(4) With permit.

(5) Higher weights available under permit.

Conversion Factors

1 inch = 2.54 centimeters
1 kip = 0.4535 tonnes

*From Reference 7.
including Indiana, not changed their weight limits to match those established by the Federal Aid Highway Act of 1974?" The answer is based on the effect this increase would have on pavement structure life. Results of the AASHO Road Test have shown that the service life of highway pavement is influenced by axle weights and the number of axle load repetitions (1). Changes of load have an effect on change in serviceability. If loads heavier than originally anticipated in the design are applied at some point in time, the pavement will deteriorate more rapidly with two net effects. First, routine maintenance costs will in-
crease and second, the life of the pavement will decrease. On the other hand, if the pavement is designed for the new loads, the change in serviceability will be essentially the same as that of the original pavement.

OVERWEIGHT TRUCKS ARE PRESENTLY USING INDIANA'S HIGHWAYS

The truck weight studies conducted in Indiana have illustrated that some trucks are in excess of Indiana and AASHTO load limits. These data are collected every two years by each state during June and July, and are sent to the FHWA in Washington where it is compiled in the form of summary tables according to the functional classification of the highway system (Interstate, Federal Aid Primary, Federal Aid Secondary, and Federal Aid Urban). Figure 3 shows the location of the

![Figure 3. Weight Stations](image-url)
weigh stations and Figure 4 shows the distribution of overweight trucks for the twelve stations opened during the 1977 Truck Weight Study conducted in Indiana.* Weigh Station 030, located 2 miles east of the

PERCENT TRUCKS OVERWEIGHT

US 30
I-74 E
I-70
I-65 N
I-74 W
I-65 S
SR 37
SR 83
I-69
US 40
US 41
US 6

Figure 4. Distribution of Overweight Trucks during the 1977 Truck Weight Study Conducted in Indiana.

*Weight Stations 064 and 094 were closed during the 1977 Truck Weight Study.
Whitley-Allen county line on U.S. 30, reported 13.7% overweight trucks which is the highest percent of overweight trucks in the state. Weigh Stations 074 and 070 followed with 7.61% and 6.52%, respectively. It is important to note that these weigh stations are located near the Indiana-Ohio State Line. The load limits in Ohio are 20,000 lbs. on a single axle, 34,000 lbs. on a tandem axle, and 80,000 lbs. gross weight in contrast to the 1956 weight limits adopted by Indiana.

The type of truck that has the highest percent of violations is the standard tractor-semi-trailer combination designated as 3-S2 (three-axles on the tractor and a tandem axle on the trailer). Weigh Station 030 reported that 89% of the violations were caused by this type of combination vehicle. In addition to the 3-S2 truck, the 3-S3 is, in most cases, in excess of Indiana load limits. This type of truck consists of a tractor with a steering axle and a tandem axle plus a semi-trailer with a tandem axle and a spread tandem.** Figure 5 shows typical configurations of both the 3-S2 and 3-S3 trucks. The average gross weight of the 3-S3 in 1977 was 72,229 lbs. compared to 60,503 lbs. for the 3-S2 truck.

**Spread Tandem Configuration is defined as a tandem axle with 4 feet spacing plus an additional axle spread at least 8 feet from the center of the tandem axle.
highways. It is important to note that most of the 3-S2 trucks that are in excess of Indiana's laws are not violating the national value of 80,000 lbs. gross weight.

Finally, the past trend in average truck weight for Indiana clearly shows that the average gross weight of the 3-S2 truck has been increasing steadily since 1971 while the national trend has remained constant (see Figure 8).

***AASHTO recommendations correspond to the ones established by the Federal Aid Highway Act of 1974.\footnote{\textsuperscript{1}}
EFFECTS OF INCREASED TRUCK WEIGHTS ON MAINTENANCE COSTS OF INDIANA HIGHWAYS

A study was conducted at Purdue University to evaluate possible changes in maintenance that might arise if heavier loads were to be permitted on Indiana highways. Only those costs associated with loads were considered. The effects of changes in vehicle size were not considered nor were any economic benefits which might result if the weight limits were increased.

Two types of maintenance operations are considered in this study, namely (1) routine, and (2) major maintenance.

Routine Maintenance

Routine maintenance is defined herein as the correction of pavement distress as it occurs at irregular time intervals. It includes all types of patching and sealing, repair of blow-ups, and all other operations related to the pavement structure during its life cycle. In this study, routine maintenance was estimated using prediction models developed by Butler (3).

Major Maintenance

Major maintenance is defined as resurfacing of the pavement surface in order to bring the road surface back to its original, constructed
condition. Major maintenance costs (overlay) were estimated using the AASHTO performance equations.

**Truck Weight Analysis**

Truck weight analysis was based on the equivalency factors developed at the AASHO Road Test. This factor is a multiplying factor that relates the number of repetitions of any axle load (N) to the number of 18,000 lbs. single axle load repetitions (EAL\text{18}) which will result in the same pavement performance. The general equation for F is:

\[ F = \left( \frac{W_1}{W_2} \right)^4 \]

Where:
- \( W_1 \) = Axle Load in question
- \( W_2 \) = Standard load (In most cases, a standard load of 18,000 lbs. on a single axle is used).

To calculate EAL 18,000, the following equation is used:

\[ EAL_{18,000} = N_j \left( \frac{W_j}{18,000} \right)^4 = N_j F_j \]  \hspace{1cm} (1.1)

Where:
- EAL\text{18,000} = Number of equivalent 18,000 pound single axle loads
- \( N_j \) = Number of Actual Repetitions of Axle Load \( W_j \)
- \( W_j \) = Axle load in question.

**Evaluation Procedure**

The effect of increased truck weights on pavement maintenance costs was evaluated using the NULOAD computer program (4). The methodology of the program is shown in Figure 9 and summarized as follows:

1. Determine the total EAL\text{18,000} for both present and proposed limits using the axle load distribution of the 1977 loadometer studies (W-4 form) applying the modified load shifting procedure proposed by Whiteside et. al. (11).
2. Predict the expected life cycle for pavements of each age of age-lane mile distributions for all representative pavement sections including time of overlay and overlay thickness.
3. Estimate routine and major maintenance needs for all representative sections.
4. Estimate total increase in maintenance costs for each year of the analysis period based on the difference of present and proposed load limits.
5. Present the results in terms of changes in Present Worth of Costs (PWOC) and Equivalent Uniform Annual Cost (EUAC). For this study, the increase in total maintenance costs was presented based on the later method.
Highways Evaluated

Highways in the U.S.A. are divided into five broad categories:

1. Interstate
2. Federal Aid Primary-Urban
3. Federal Aid Primary-Rural
4. Federal Aid Secondary-Urban
5. Federal Aid Secondary-Rural

For the purpose of this study, only three highway types were considered, Interstate, Primary, and Secondary. Primary roads were U.S. and State Routes with ADT > 4,000 vpd. Secondary roads were U.S. and State Routes with ADT < 4,000 vpd. The 1975 Traffic Flow Map was used to determine the ADT of each of the pavement sections. This value was corrected for 1978 in order to have all the data on the same time basis.

Pavement Types Evaluated

For the purpose of this study the pavements encountered on the state highway system were classified into four major design categories:

1. Flexible
2. Jointed Reinforced Concrete Pavements
3. Continuously Reinforced Concrete Pavements
4. Overlay Pavements

Flexible Pavements included an asphalt surface on a nonstabilized base and subbase on the natural subgrade and full-depth asphalt pavements.

Jointed Reinforced Concrete Pavements (JRCP) are concrete pavements without an overlay with joints, typically spaced at 40 feet intervals. In some cases plain pavements were placed in this category but these were minimal since the older plain pavements have been overlayed.

Continuously Reinforced Concrete Pavements (CRCP) are pavements without joints and containing continuous steel.

Overlay Pavements are concrete pavements with an appreciable amount of asphaltic concrete.

The actual classification of each pavement section was made after a search of the road life data in the Planning Division of the Indiana State Highway Commission.

Soil Types Evaluated

Eleven types of soils were evaluated in this study as shown in Table 2 with their corresponding soil support values. The AASHTO design method makes use of the soil support value for flexible pavements. For
Table 2. Soil Support Values for the Major Soil Units of Indiana

<table>
<thead>
<tr>
<th>Major Soil Unit</th>
<th>Soil Support Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Porous Substrata (sands and gravel)</td>
<td>6.8</td>
</tr>
<tr>
<td>2. Sands (except Kankakee sands)</td>
<td>6.2</td>
</tr>
<tr>
<td>3. Kankakee Sands</td>
<td>5.6</td>
</tr>
<tr>
<td>4. Lakebeds</td>
<td>4.0</td>
</tr>
<tr>
<td>5. Young drift till plains (silty-clays)</td>
<td></td>
</tr>
<tr>
<td>6. Areas of sand, gravel, and till eskers</td>
<td>6.3</td>
</tr>
<tr>
<td>7. Old drift silts and silty-clays</td>
<td>5.0</td>
</tr>
<tr>
<td>8. Sand: some water-deposited sand</td>
<td>6.0</td>
</tr>
<tr>
<td>9. Loess—Silt</td>
<td>5.3</td>
</tr>
<tr>
<td>10. Limestone</td>
<td>4.9</td>
</tr>
<tr>
<td>Interbedded limestone and shale</td>
<td></td>
</tr>
<tr>
<td>11. Sandstone and some shale</td>
<td>5.1</td>
</tr>
<tr>
<td>Interbedded shale and sandstone</td>
<td></td>
</tr>
</tbody>
</table>

Concrete pavements, the modulus of subgrade reaction was used and it is obtained from correlations with the soil support value and the California Bearing Ratio (CBR).

Traffic Data

This information was obtained from the 1977 truck weight study conducted in Indiana. Since these traffic data correspond mainly to the Interstate System and some U.S. routes, a multiplying factor was applied to the original traffic data in order to provide a traffic distribution to the primary and secondary roads included in this study. These multiplying factors were obtained from the 1975 NHIPS Study (5). A factor of 6% trucks was used for the primary system and 4% for the secondary system.

Geographical Area (Climate)

Geographical area was included in the study to take into account different climatic conditions from the ones encountered at the AASHO Road Test. For Indiana, as well as the AASHO Road Test, the primary effect results from freezing temperatures. The effects of frost and other environmental considerations are interrelated with effects of load applications.

To analyze the effect of climate on load related costs, the following steps were taken. First, the pavements in the state were stratified on a regional basis, from north to south. Second, a correction factor was
assigned to each of the regions in order to take into account climatic variations. These correction factors known as regional factors, were developed in satellite research studies across the United States for the Road Test. The values used in this study were:

- Northern Indiana 1.5
- Central Indiana 1.1
- Southern Indiana 1.0

Finally, it was possible to divide the state into three regions according to the unique interrelationships among soil type, freezing index, and rainfall. These relationships are shown in Figure 10. The southern

Figure 10. Soils—Rocks and Climate
Boundary of the northern region extends on a line from just north of Kentland in Newton County through Monticello in White County north of Portland in Jay County. The southern boundary of the central region extends from a line just south of Newport in Vermillion County through a point north of Franklin in Johnson County and from there, north of Lawrenceburg.

Selection of Pavement Sections
The statistical techniques used in this study for the selection of specific pavement sections, relied on both random and stratified sampling.

A total of 300 pavement sections were sampled to represent the entire state system. For each pavement section all information explained in previous paragraphs was tabulated. Each section of road was a construction contract section that averaged 5 miles in length. The final classification of these pavement sections is given in Table 3.

Table 3. Number of Pavement Sections Included in Study

<table>
<thead>
<tr>
<th></th>
<th>North</th>
<th>Central</th>
<th>South</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. and State Roads</td>
<td>ADT &gt; ADT &lt; 4000</td>
<td>U.S. and State Roads</td>
<td>ADT &lt; 4000</td>
</tr>
<tr>
<td>Inter-state</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Jointed Concrete</td>
<td>1</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>Overlay</td>
<td>4</td>
<td>24</td>
<td>15</td>
</tr>
<tr>
<td>Flexible</td>
<td>0</td>
<td>4</td>
<td>21</td>
</tr>
</tbody>
</table>

Cost Data
Unit cost information is needed for the different maintenance activities on a given pavement section. These include unit cost of asphalt concrete, granular material, patching, crack sealing, base and surface repair, and blowup repair. The unit cost of these materials as well as typical maintenance costs was obtained from the “Catalog of U.P.A. Prices for Roads and Bridges” prepared by the Indiana State Highway Commission (8). It is important to note that the latest unit cost information and estimates of increased maintenance costs presented in this study are given in terms of 1978 dollars.
Increased Pavement Maintenance Costs

The cost range presented herein are estimates of the added routine maintenance costs and resurfacing costs that would be required if the weight limits in Indiana are increased from 73,280 to 80,000 lbs. gross. These cost ranges are those attributed directly to load changes.

Tables 4 and 5 show the estimated increased pavement costs with

Table 4. Range in Increased Pavement Maintenance Costs
(Resurface Only, 1-\(\alpha\) = 0.90)*

\[ \begin{array}{cccc}
\text{System Totals} & \text{North} & \text{Central} & \text{South} \\
\hline
\text{Interstate} & 458.81-727.34 & 447.30-764.94 & 420.18-968.13 & 458.98-811.26 \\
\text{Primary} & 354.08-584.28 & 533.54-829.04 & 377.22-600.72 & 425.01-655.17 \\
\text{Secondary} & 234.68-494.60 & 261.29-682.77 & 204.87-374.31 & 212.14-489.92 \\
\end{array} \]

\[ \begin{array}{cccc}
\text{System Totals} & \text{North} & \text{Central} & \text{South} \\
\hline
\text{Interstate} & \text{b. Dollars per year} & \\
951,287.99 & \text{1,567,213.51} & \text{1,567,213.51} & \text{5,734,268.64} \\
880,274.75- & 1,452,572.67 & 1,460,486.61 & 1,192,435.21 & 4,084,041.51 \\
1,234,689.97- & 1,052,321.96- & 1,052,321.96- & 2,482,992.63- \\
1,726,231.49 & 2,749,794.73 & 1,567,213.51 & 5,734,268.64 \\
\end{array} \]

*All costs are in 1978 dollars.

Table 5. Range in Increased Pavement Maintenance Costs
(Resurface Plus Routine Maintenance, 1-\(\alpha\) = 0.90)*

\[ \begin{array}{cccc}
\text{System Totals} & \text{North} & \text{Central} & \text{South} \\
\hline
\text{Interstate} & 589.61-821.56 & 967,402.55 & 491,308.07 & 2,129,639.66 \\
951,287.99 & 1,654,381.63 & 1,132,015.05 & 5,764,181.29 \\
880,274.75- & 939,916.08- & 748,785.47- & 2,649,325.34- \\
1,452,572.67 & 1,460,486.61 & 1,192,435.21 & 4,084,041.51 \\
819,069.97- & 1,052,321.96- & 857,778.40- & 2,482,992.63- \\
1,726,231.49 & 2,749,794.73 & 1,567,213.51 & 5,734,268.64 \\
\end{array} \]

\[ \begin{array}{cccc}
\text{System Totals} & \text{North} & \text{Central} & \text{South} \\
\hline
\text{Interstate} & 589.61-821.56 & 967,402.55 & 491,308.07 & 2,129,639.66 \\
951,287.99 & 1,654,381.63 & 1,132,015.05 & 5,764,181.29 \\
880,274.75- & 939,916.08- & 748,785.47- & 2,649,325.34- \\
1,452,572.67 & 1,460,486.61 & 1,192,435.21 & 4,084,041.51 \\
819,069.97- & 1,052,321.96- & 857,778.40- & 2,482,992.63- \\
1,726,231.49 & 2,749,794.73 & 1,567,213.51 & 5,734,268.64 \\
\end{array} \]

*All costs are in 1978 dollars.
and without routine maintenance. For practicality, these cost estimates are presented in two forms: (1) total increase in maintenance costs per lane-mile per year, and (2) total increase in maintenance costs per year.

The analysis indicates that the Interstate Highways have the highest cost per lane-mile, but the lowest total maintenance costs as compared to primary and secondary roads. This can be attributed to the fact that the Interstate system carries the highest percent of trucks in the state (e.g. having the highest number of EAL applications) but, on the other hand, it has the smallest number of miles in the state as compared to primary and secondary roads. In addition, since costs are attributed directly to load changes, it is expected that the Interstate system would have a higher increase in maintenance cost as compared to the other two systems. However, it is important to recognize that the Interstate Highways are designed to withstand a higher number of EAL applications compared to primary and secondary roads.

**Total Increased Maintenance Costs**

Total increased maintenance costs can be estimated using the midpoint of ranges shown in Table 4 for resurface only and Table 5 for resurface plus routine maintenance. Note that these estimates are based upon a confidence level of 90 percent.

The increase in maintenance costs for pavements in the state highways systems can be expected to range between 10.43 and 12.15 million dollars annually in 1978 dollars as shown in Table 6.

<table>
<thead>
<tr>
<th>Road Type</th>
<th>Increased Costs (Millions Dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Resurface Only</td>
</tr>
<tr>
<td>Interstate</td>
<td>2.95</td>
</tr>
<tr>
<td>U.S. and State Routes</td>
<td></td>
</tr>
<tr>
<td>ADT &gt; 4,000 (Primary)</td>
<td>3.37</td>
</tr>
<tr>
<td>ADT &lt; 4,000 (Secondary)</td>
<td>4.11</td>
</tr>
<tr>
<td>TOTAL FOR HIGHWAY SYSTEMS</td>
<td>10.43</td>
</tr>
</tbody>
</table>

**Sensitivity Analysis**

Due to the present energy shortage, the price of asphalt cement has been increasing steadily. A sensitivity analysis was conducted to check the importance of this variable on increased pavement maintenance costs. The cost of resurface was determined using prices of $20, $22.5, $25, $30 and $40 per ton. The results of this analysis are presented in Figure 11. It was found that the cost of resurface bears a direct linear
relationship to asphalt concrete prices. Routine costs, on the other hand, do not vary linearly with asphalt prices since these costs include many other functions of maintenance exclusive of overlay.

**Studies Conducted by Other States**

Cost estimates have been reported by other state highway departments concerned with the increase of weight limits from 73,280 lbs. to 80,000 lbs. gross. A study conducted by the Iowa DOT showed an overall cost estimate ranging from 8.8 million to 12.4 million dollars annually (10). These cost estimates, however, are based on 1980 dollars in contrast to 1978 dollars presented herein.

A study conducted in Mississippi estimates that the same increase (e.g. from 73,280 lbs. to 80,000 lbs. gross) would be 5 million dollars annually.

Another study conducted by the Arkansas Highway Department indicates that the same increase will result in a service life loss of 35 percent on primary roads, 54 percent on secondary roads and 9 percent on the Interstate system (2). The Arkansas study did not present any cost
figures but concluded that the state of Arkansas cannot afford an increase in load limits from 73,280 lbs. to 80,000 lbs.

**Summary and Conclusions**

This paper presented an overview of the current issues concerning truck size and weight in the United States. Emphasis was given to the information obtained from the 1977 truck weight study concerning overweight trucks presently traveling on Indiana highways, specifically the 3-S2 and 3-S3 trucks. Also, the results of a study conducted at Purdue concerning the effect of increasing truck weights limits from 73,280 to 80,000 lbs. gross on pavement maintenance costs were presented.

Based on this study, the following conclusions can be made:

1. It is very difficult for the state of Indiana to enforce the weight limits adopted from the Federal Aid Highway Act of 1956 since three out of the four states that surround Indiana have adopted those weight limits established by the Federal Aid Highway Act of 1974. In addition, one state is protected under the “grandfather clause” which permits loads in excess of those specified by the Act.

2. Overweight trucks cause an increase in highway deterioration (decrease in the life of the pavement) as well as an increase in routine maintenance costs.

3. Increase in truck weight limits from 73,280 lbs. to 80,000 lbs. gross will cause an increase in maintenance costs for the total state mileage between 10.43 and 12.15 million dollars annually in 1978 dollars. This increase depends largely on the effect of the present energy shortage mainly of petroleum which greatly influences the cost of asphalt concrete.

**REFERENCES**


