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# *Department of Transportation*

SUMMARY OF FINDINGS  
OF A  
U.S. D.O.T. STUDY  
ON  
"AN INVESTIGATION OF  
TRUCK SIZE AND  
WEIGHT LIMITS"

PRESENTED TO THE TRANSPORTATION COMMISSION  
APRIL 13, 1982

SOURCE: OFFICE OF POLICY ANALYSIS  
IOWA DEPARTMENT OF TRANSPORTATION  
515/239/1322

## Federal Truck Size and Weight Study

- Purpose**
- Fulfill requirements of Section 161 of the 1978 Surface Transportation Assistance Act.
  - Analyze and report to Congress the costs and benefits of various alternative approaches to greater uniformity among the states' truck size and weight limits.
- Background**
- States have a wide variety of restrictions on truck size, weight, and configuration.
  - Several Midwestern states limit gross weight to less than 80,000 lbs. causing a "barrier" to interstate commerce. (Figure 1)
  - Some eastern states limit truck-tractor semitrailer combinations to less than 60 feet. (Figure 2)
  - Some eastern states do not permit twin trailer combinations.
  - Truckers must respond to these differences in one of the following ways:
    1. Configuring loads for the states with the most restrictive limits.
    2. Traveling out of distance to avoid restrictive states.
    3. Reloading at state lines.
    4. Risking oversize or weight violations.
  - All of these alternatives are inefficient and contribute to higher trucking costs.
  - States may perceive valid reasons for restrictions such as: terrain, highway condition, traffic density.
- Study Design**
- The study evaluates each approach with respect to various kinds of costs:
    1. Shipping costs.
    2. Costs of maintaining the highway system (includes maintenance and construction)

**STATES WITH GROSS WEIGHT LIMITS LESS THAN 80,000 LBS.  
January 1, 1982**

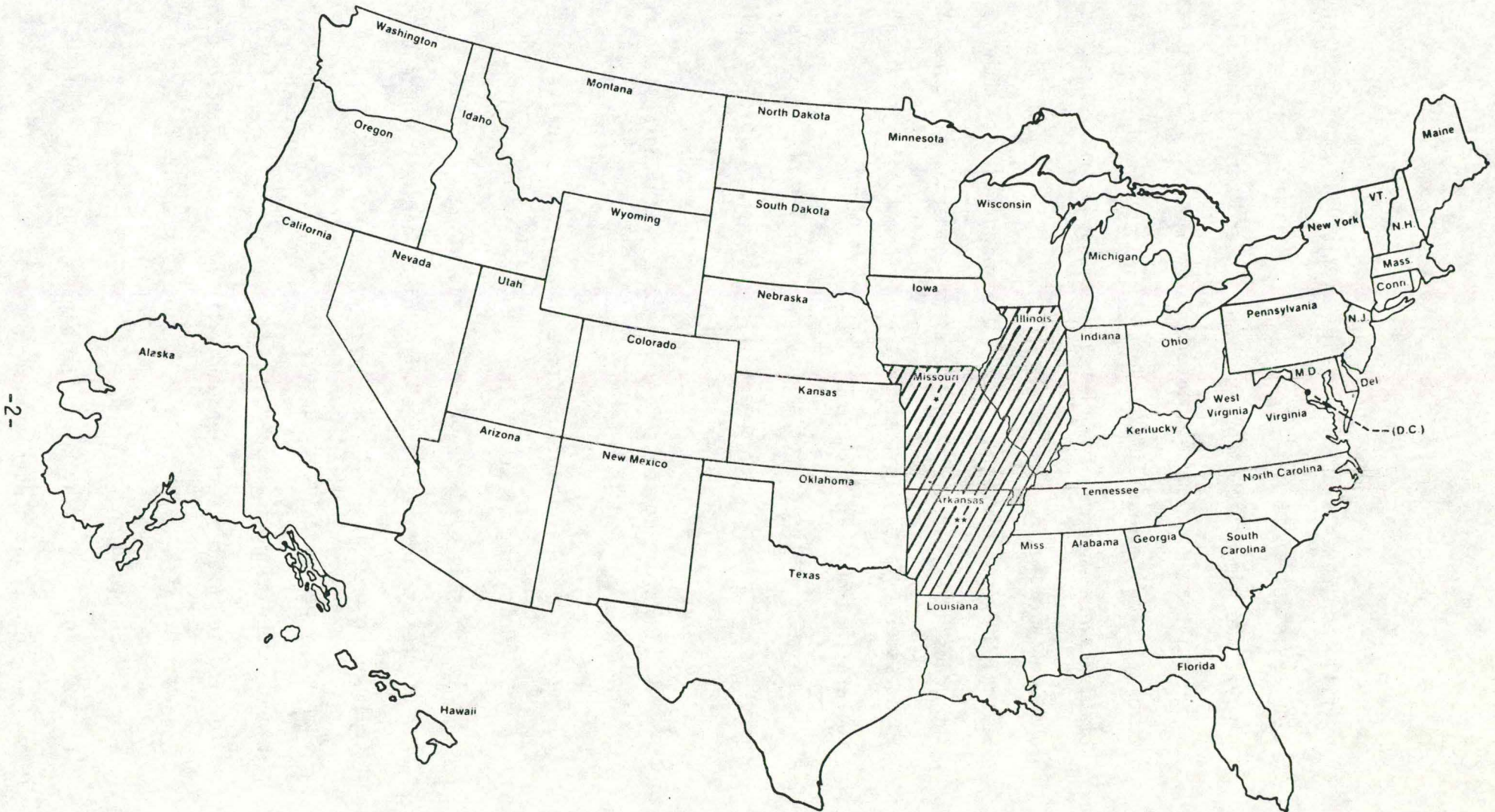


FIGURE 1

\* Missouri legislature passed 80,000 lb. law in 1981 but it will not become effective unless approved by public referendum on April 6, 1982. - Referendum failed.  
\*\* Arkansas legislature passed 80,000 lb. law in 1981 but it only applies to Arkansas grown agricultural products including livestock and poultry produced and processed in Arkansas.

**STATES WITH TRUCK TRACTOR SEMI TRAILER LENGTH  
LIMITS LESS THAN 60 FEET  
January 1, 1982**

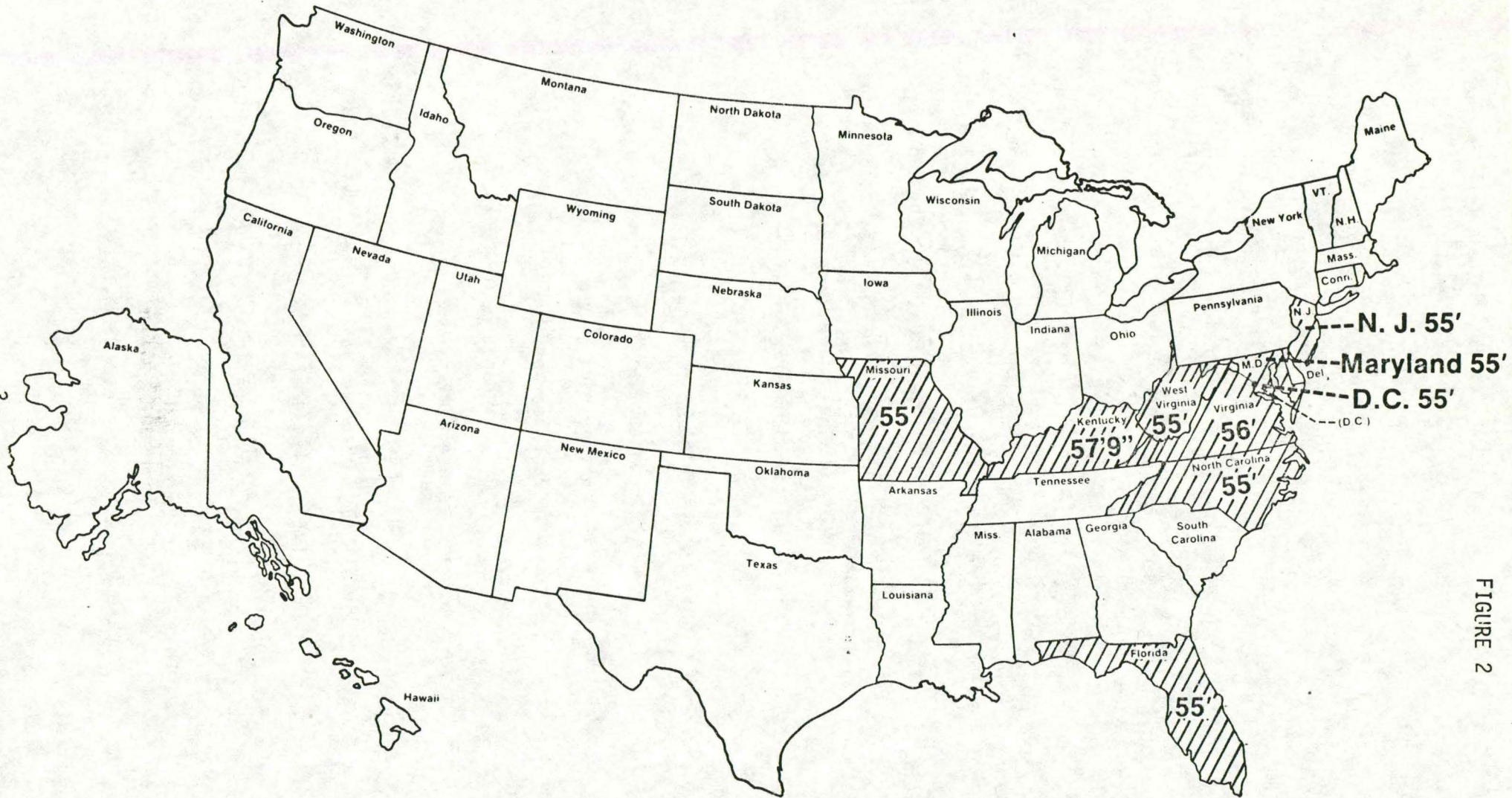


FIGURE 2

3. Environmental costs.

4. Energy costs.

- Benefits are expressed in terms of cost savings.
- Costs are expressed in 1980 dollars and are based on projections of traffic and pavement conditions to 1985. Each alternate is compared with the "base case" which is a projection of conditions based on present laws to 1985.

Alternative Approaches To Uniformity - Nine approaches were analyzed, some using increased limits and some using decreased limits:

(Letter designation is as used in the study.)

1. Grandfather Clause Elimination: These two alternatives consist of removing the grandfather clause that allowed states to retain weight limits that were higher than the federal limits that were established in 1956.

Alternate B would eliminate the grandfather clause only on the Interstate system. This would reduce truck productivity on the Interstates in those states. Pavement costs on Interstate routes in those states would be lower because of decreased truck weight. Pavement cost on other primary highways could be expected to rise, however, because heavy trucks would be diverted from Interstate to primary routes. The net effect of Alternate B would be an increase in total cost of \$5.1 billion.

Alternate C eliminates the grandfather clause on primary routes as well as Interstates. This would result in a net decrease in pavement cost but not enough to offset the large increase in transportation cost. Alternate C results in a total increase in cost of \$11.2 billion.

2. Barrier Elimination: These three alternates call for the removal of weight or length restrictions that act as barriers to long-range interstate trucking.

Alternate D would prohibit states from restricting truck axle and gross weight on the Interstate system to less than 20/34/80 thousand pounds. Total freight cost savings outweigh the relatively small increases in pavement cost. A net savings of \$2.2 billion would result from Alternate D.

Alternate E would eliminate the barrier of lower weight limits and would also require states that allow twin trailer trucks to set length limits no lower than 65 feet. Alternate E would also apply only to the Interstate system. States would still be allowed to prohibit doubles or triples altogether. Total savings from Alternate E would be \$4.2 billion.

Alternate F would remove weight and length barriers on Interstate and primary routes. This would result in much higher pavement and bridge costs but these would be offset by lower truck freight costs. Net savings from Alternate F would be \$33.1 billion.

3. Uniformity - This alternate (G) is a combination of the first two concepts. Uniformity in length and weight limits is achieved by eliminating both the grandfather clause and the barrier limits. The effects of this alternate would vary from one state to another. The net effect of Alternate G would be a cost saving of \$5.2 billion.

4. Reduction of Limits - Alternate H is a rollback of limits to the pre-1974 levels. These were 73,280 pounds for gross weight and 18,000 and 32,000 pounds for single and tandem axles. Although this results in substantial highway cost savings, the enormous increase in transportation costs cause a net cost increase of \$51.4 billion.
5. Increases in Limits - These two alternates take different approaches to raising truck weight limits and prohibiting states from being more restrictive.

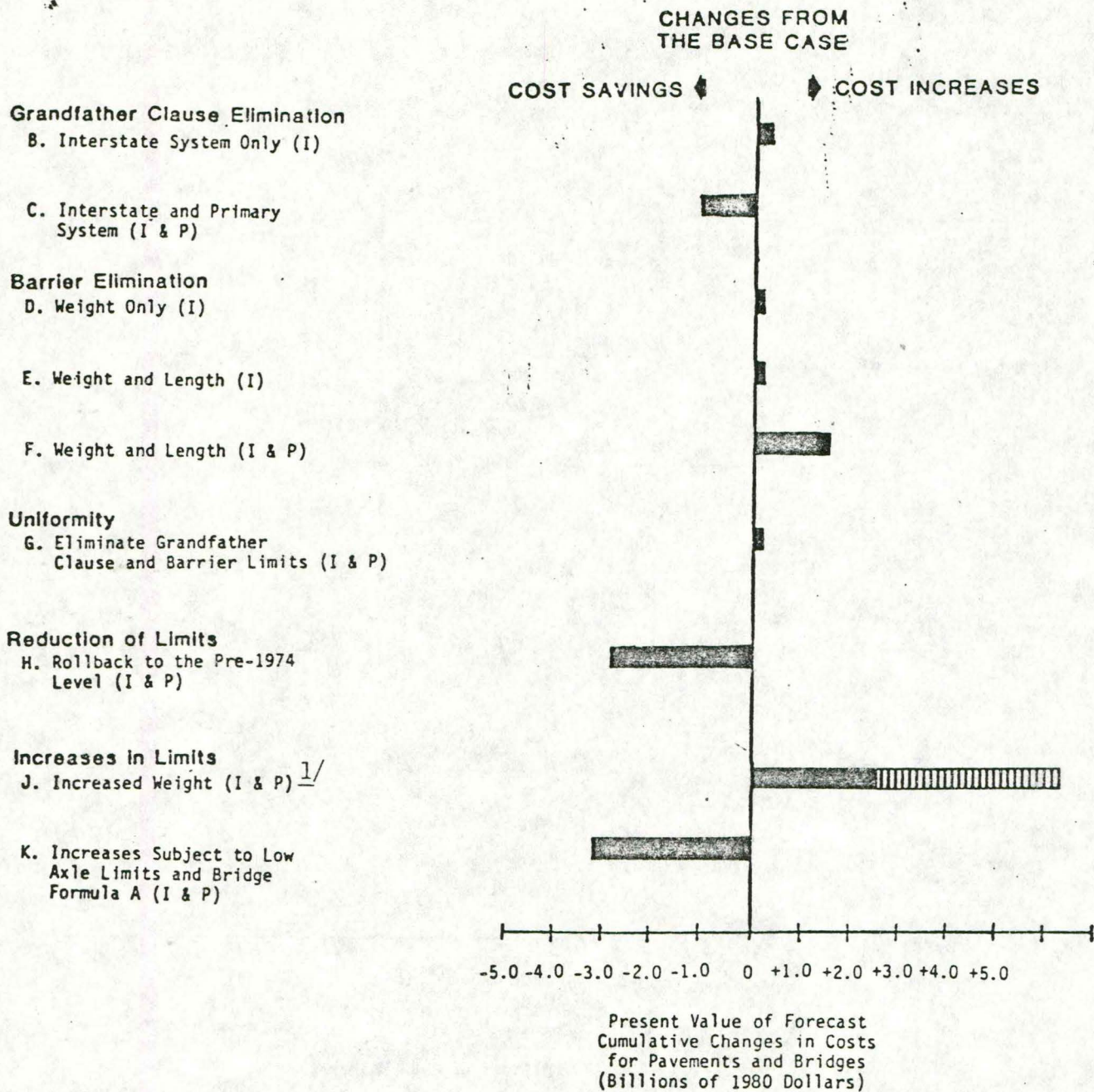
Alternate J increases limits to 22,400 pounds for a single axle and 36,000 pounds for a tandem axle. Gross weight limits are eliminated except as governed by the higher Bridge Formula C. The study is somewhat ambiguous about the effects of this alternative. The weight limits used create a potential for a shift to different vehicle configurations such as short heavyweight doubles which would help to moderate the severe increase in pavement damage. If such a shift does occur, Alternate J would result in savings of \$56.8 billion. If no appreciable shift occurs, then savings would only amount to \$47.5 billion.

Alternate K also removes the gross vehicle weight limit but protects pavements and bridges by using the pre-1974 axle limits and the more restrictive Bridge Formula A. Alternate K reduces highway costs slightly and increases transportation costs. The net result is a cost savings of \$0.9 billion.

The impacts of the alternatives studied are summarized in Figures 3 through 6.



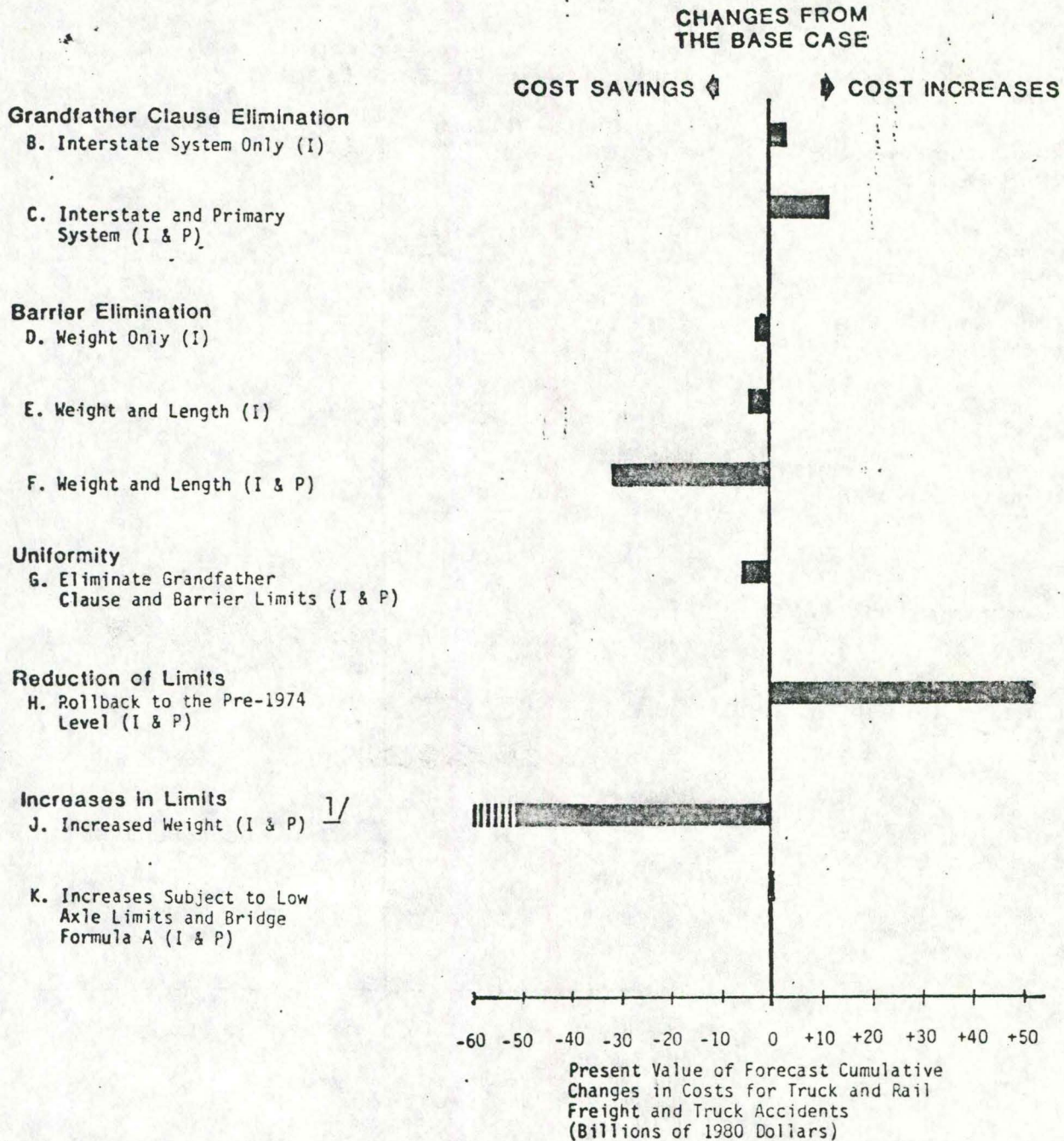
### PRESENT VALUE OF HIGHWAY COST IMPACTS



<sup>1/</sup>The striped portion of the bar represents the range of the possible impact, depending on the extent of the shift to the short heavyweight doubles. (See Section 5.7)

Figure 3

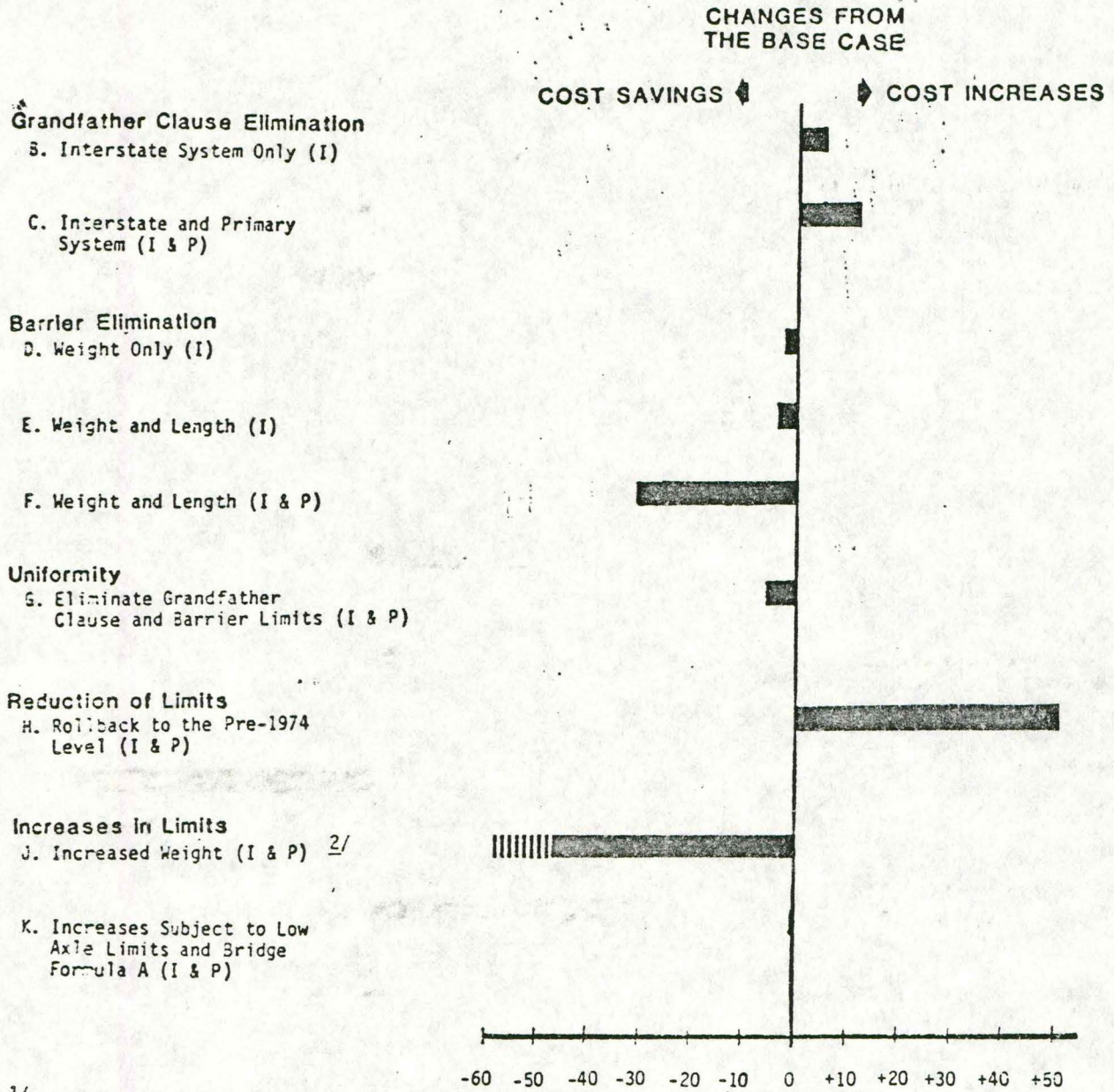
### PRESENT VALUE OF TRANSPORTATION COST IMPACTS



<sup>1/</sup>The striped portion of the bar represents the range of the possible impact, depending on the extent of the shift to the short heavyweight doubles. (See Section 5.7)

Figure 4

# PRESENT VALUE OF ALL SCENARIO COST IMPACTS<sup>1/</sup>



<sup>1/</sup> Some non-monetary impacts are not included (air quality, noise and pain and suffering due to injuries and accidents).

<sup>2/</sup> The striped portion of the bar represents the range of the possible impact, depending on the extent of the shift to the short heavyweight doubles. (See Section 5.7)

Present Value of Forecast Cumulative Changes in  
in All Scenario Cost Impacts Combined  
(Billions of 1980 Dollars)

Figure 5

PRESENT VALUE OF SCENARIO COST IMPACTS<sup>1/</sup>

PRESENT VALUE OF FORECAST CUMULATIVE CHANGES IN COST  
(Each Scenario Minus Base Case in Millions of 1980 Dollars)

| 1980 PRESENT VALUE OF IMPACTS                       | B                            | C                              | D                                 | E                                | F                           | G                  | H                | J                                                                                |          | K                          |
|-----------------------------------------------------|------------------------------|--------------------------------|-----------------------------------|----------------------------------|-----------------------------|--------------------|------------------|----------------------------------------------------------------------------------|----------|----------------------------|
|                                                     | Grand-father Elimination (I) | Grand-father Elimination (I&P) | Barrier (Wt Only) Elimination (I) | Barrier (Wt & L) Elimination (I) | Barrier Elimination (I & P) | Uniformity (I & P) | RollBack (I & P) | Increased Weights (I & P)<br>Minor Shift <sup>2/</sup> Major Shift <sup>2/</sup> |          | Low Axle/Formula A (I & P) |
| <b>A. PAVEMENT COSTS</b>                            |                              |                                |                                   |                                  |                             |                    |                  |                                                                                  |          |                            |
| OVERLAYS                                            | 90.5                         | -408.5                         | 110.2                             | 114.5                            | 762.7                       | 241.2              | -1007.9          | 2411.7                                                                           | 596.2    | -1420.7                    |
| MAINTENANCE                                         | 248.4                        | -690.6                         | 104.1                             | 107.3                            | 763.5                       | -114.5             | -1664.8          | 2579.0                                                                           | 684.5    | -1965.9                    |
| SUBTOTAL                                            | 338.9                        | -1099.1                        | 214.3                             | 221.8                            | 1526.2                      | 126.7              | -2672.7          | 4990.7                                                                           | 1280.7   | -3386.6                    |
| <b>B. BRIDGE COSTS</b>                              |                              |                                |                                   |                                  |                             |                    |                  |                                                                                  |          |                            |
| EXISTING BRIDGES                                    | -10.2                        | -34.9                          | 6.0                               | 6.0                              | 85.3                        | 51.3               | -280.8           | 1257.0                                                                           | 1257.0   | 136.8                      |
| NEW BRIDGES                                         | -2.6                         | -6.3                           | 2.6                               | 2.6                              | 7.9                         | 1.5                | -30.5            | 108.2                                                                            | 108.2    | 58.7                       |
| SUBTOTAL                                            | -12.8                        | -41.2                          | 8.6                               | 8.6                              | 93.2                        | 52.8               | -311.3           | 1365.2                                                                           | 1365.2   | 195.5                      |
| <b>C. TRUCK ACCIDENT COSTS</b>                      |                              |                                |                                   |                                  |                             |                    |                  |                                                                                  |          |                            |
| BASED ON BIO TECH STUDY                             | 211.3                        | 658.5                          | 434.9                             | 521.3                            | 489.8                       | 388.3              | 2599.8           | 2506.5                                                                           | 10966.0  | 15691.0                    |
| BASED ON UNIFORM RATE FOR ALL COMBINATIONS          | 146.8                        | 610.5                          | 403.4                             | 305.9                            | -1340.4                     | 197.6              | 2387.2           | -2461.3                                                                          | -4462.9  | -1983.8                    |
| <b>D. FREIGHT COSTS</b>                             |                              |                                |                                   |                                  |                             |                    |                  |                                                                                  |          |                            |
| TRUCK FREIGHT COSTS                                 | 3601.4                       | 10392.8                        | 6567.8                            | 4571.3                           | -23007.0                    | 2906.9             | 44760.5          | -39690.5                                                                         | -48568.5 | 485.1                      |
| RAIL FREIGHT COSTS                                  | 952.1                        | 1325.0                         | -9422.8                           | -9422.6                          | -10243.0                    | -8582.7            | 7090.5           | -14161.3                                                                         | -14161.3 | -5018.6                    |
| SUBTOTAL                                            | 4553.5                       | 11717.8                        | -2855.0                           | -4851.3                          | -33250.0                    | -5675.8            | 51851.0          | -53851.8                                                                         | -62729.7 | -4533.5                    |
| <b>E. HIGHWAY COSTS (A + B)</b>                     | 326.1                        | -1140.3                        | 222.9                             | 230.4                            | 1619.4                      | 179.5              | -2984.0          | 6355.9                                                                           | 2645.8   | -3191.1                    |
| <b>F. TRANSPORTATION COSTS (C + D)<sup>3/</sup></b> | 4732.6                       | 12352.3                        | -2435.9                           | -4437.7                          | -33675.3                    | -5382.9            | -54344.5         | -53829.2                                                                         | -59478.2 | 2320.1                     |
| <b>G. TOTAL PRESENT VALUE (E + F)<sup>3/</sup></b>  | 5058.7                       | 11212.0                        | -2213.0                           | -4207.3                          | -32055.9                    | -5203.4            | 51360.5          | -47473.3                                                                         | -56832.4 | -871.0                     |

Figure 6

<sup>1/</sup>Some non-monetary impacts are not reflected in this table. Such impacts include the loss of life and suffering associated with fatal and non-fatal injuries (although the economic costs in such accidents are included), air quality and noise. Furthermore, comparisons based on this table alone do not reflect the fact that some impacts are severe on some groups (e.g., particular States), whereas other impacts are spread more widely and evenly (e.g., truck freight cost decreases).

<sup>2/</sup>Minor shift refers to the Scenario J variation in which only traffic diverted from rail is carried by short heavyweight doubles. Major shift refers to the variation in which a substantial shift from tractor-semitrailers to short heavyweight doubles is assumed to occur in addition to the shift from rail. See Section 5.7 for further description of these two variations of Scenario J.

<sup>3/</sup>An average value for the alternative estimates of truck accident costs is used in calculating totals.

Comments  
On The  
Study

- This federal study is very comprehensive in its scope and represents a sincere attempt by the U.S. Department of Transportation to develop background material for Congress in an area of considerable controversy. The study is from a national perspective and the nationwide impacts are aggregated. These impacts are not borne equally by the states, however. The impact of removing weight barriers may be detrimental to the states that presently have lower weight limits while other states benefit. The present state of the highway system and highway finance are not given sufficient consideration in the analysis of highway impacts. Where highways are underfinanced now, the imposition of additional burdens on the system may compound the impact of alternatives that include increased weight limits. It should be made clear that the substantial benefits to be derived from these alternatives require increased funding for the highway system. The question of how these funds should be raised will be considered when the Federal Cost Allocation Study is released.

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