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# Evaluating Grade Crossing Safety

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# Introducing Economic Reality Into the Discussion of Crossing Safety

- ❑ Crossing cases are emotional and “safety experts” can actually make them more so by introducing bias
  - ❑ Statistics are cold but useful
  - ❑ Economics is calculating but informative
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# The Harvey Levine Spiel

- ❑ Passive crossings are dangerous and they all should be gated (two years ago)
  - ❑ There is a positive cost/benefit relationship to gating crossings (last year)
  - ❑ American railroads are making excessive profits because of the Staggers Act and should pay for gating
  - ❑ Railroads are not safe because of the profit motive
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Before Confronting Dr.  
Levine's Argument,  
Let's Get Some Facts  
Straight

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# Trains Are Safe



- ❑ Since 1986 the number of people killed or injured in railway accidents has steadily declined
- ❑ In 1988 637 vehicle passengers were killed and another 2,379 were injured by trains, in 1997 those numbers had dropped to 567 and 1,710 respectively. In 2001 they hit an all time low of 418 and 1,035 and have fallen further since
- ❑ The frequency of a fatality accident at a railroad crossing is one in 505 years

# What About Trucks?

- In 2003 large trucks injured about 122,000 people, that same year about 1000 were injured by trains at crossings
- In 2002 4,986 people were killed by trucks on our nation's highways, about 350 were killed by trains at crossings
- Trucks only shipped .2% more ton miles than trains, that year while causing almost 6 times as many deaths (all causes)



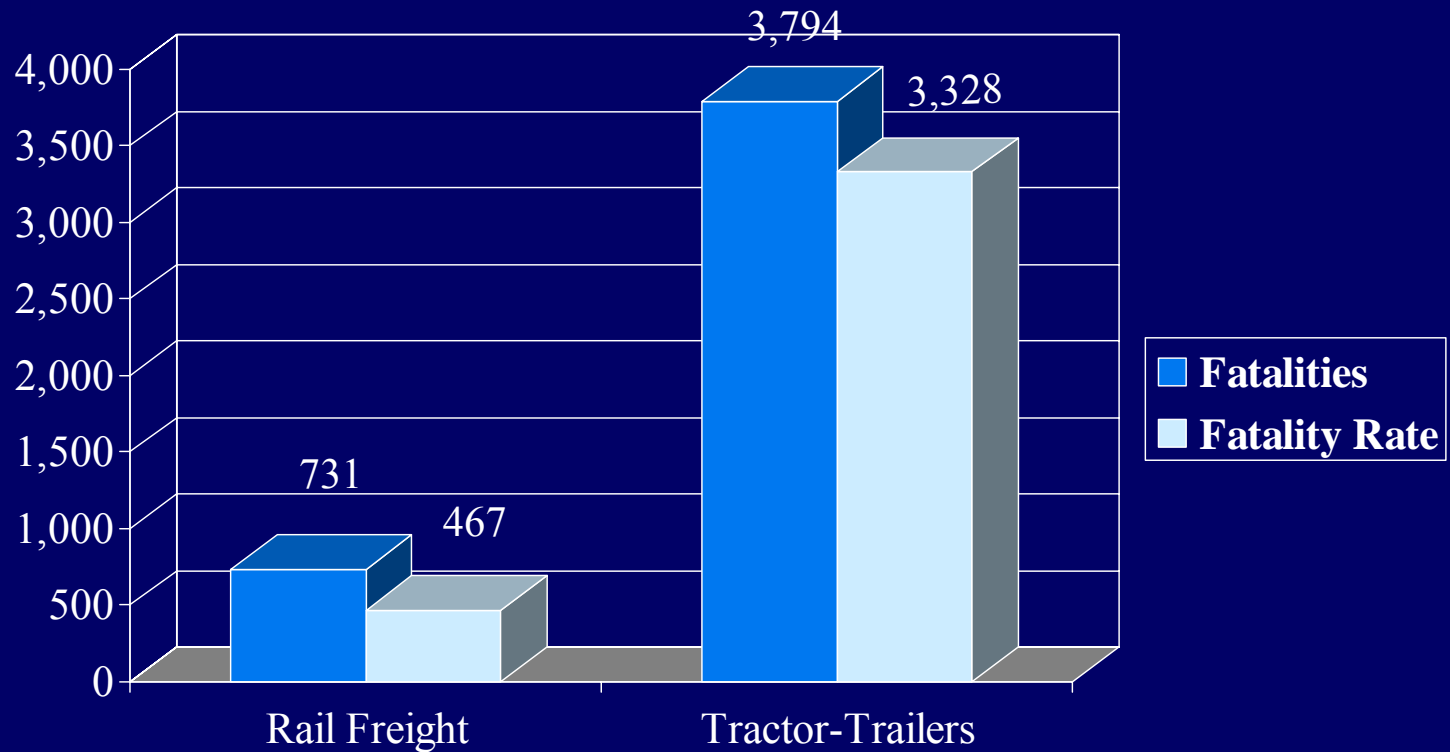


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# Trucks are Inherently More Dangerous

- According to USDOT statistics you are
    - 5.82 times more likely to die
    - 13.75 times more likely to be injured
    - 77.75 times more likely to be in an accident with a truck than a train
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Rail freight transport incurs about 14% of the fatalities that trucks do per trillion ton-miles.





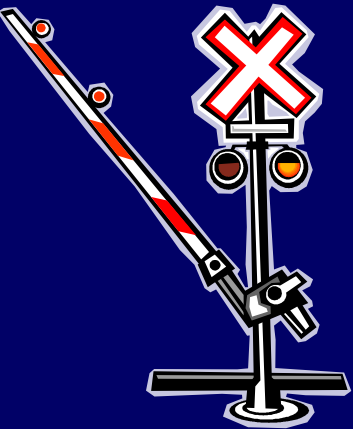
# Gating



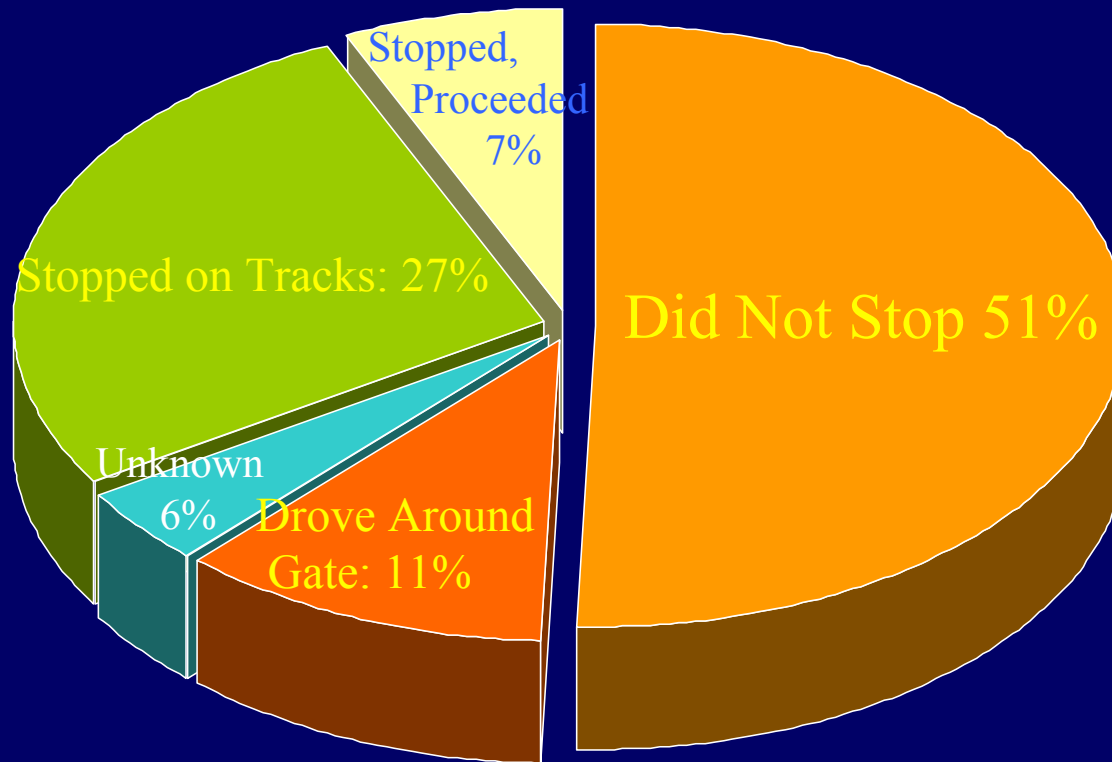
- It is a commonly-held belief that by putting up more gates at highway-rail crossings more lives can be saved than are actually lost every year
- Over 93% of the lives saved over the past decade have been at non-gated crossings
- A June 2004 The Department of Transportation Office of the Inspector General study found “ Risky behavior or poor judgment accounted for ... 94 percent of public grade crossing accidents [between 1994 and 2003].”

# Gating (cont.)

- 51% of fatal accidents occur at crossings with active warning devices (gates or lights) and in almost every case, the driver went around or through the “gate”
- Crossings with gates account for 26% of crossings and 31% of fatal accidents
- Gates are less effective at reducing accidents at low traffic crossings than those with high traffic counts (easier to run)



# Grade crossing accidents are usually caused by motorist error.




Sources: FRA, Railroad Safety Statistics Annual Report 2003, Table 8-6.



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# What Does it Cost to Gate?

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- ❑ BNSF average cost for installation of lights and gates in 2003 was \$177,000 – paid for by State
  - ❑ Average annual maintenance for gate is \$7,600 (BNSF)
  - ❑ Present value is about \$300,000
  - ❑ Annual cost is about \$23,000, about \$1.5 billion per year to gate all passive crossings
  - ❑ Gating would reduce fatalities by about 56%; the cost per life saved would be \$6.5 million
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## Crossing Upgrades Compete for Funds With Other Highway Projects

- There is a limited amount of money to spend on highway safety
  - Good public policy is to accept projects with the highest ratio of benefits to costs
  - Standard estimate of economic loss associated with a fatality is \$3.5 million
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# Benefit-Cost Ratios for Selected Roadway Improvements

- Rumble Strips - 60
  - Traffic Signs- 22.4
  - New Median Barriers – 9.3
  - New Traffic Signals- 8.5
  - Upgrade Bridge Rail- 6.9
  - Pavement Marking and Delineation- 3.1
  - New RR Crossing Lights and Gates- varies from about .1 to 2 (average  $\approx$  .4)
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# What is the Distribution of the Cost/Benefit for Crossings?

- The distribution by cost per life saved and number of gates is:
    - < \$2 Million : 2,009
    - \$2-6 Million: 7,803
    - \$6-10 Million: 6,130
    - \$10-20 Million: 11,382
    - > \$20 Million: 36,736
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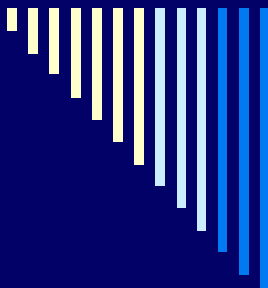
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For the cost of a life saved by gating crossings, society could

- Save 150 lives by installing rumble strips
  - Save 56 lives by installing traffic signs
  - Save 23 lives with cable and Jersey barriers
  - Save 21 lives by upgrading traffic signals
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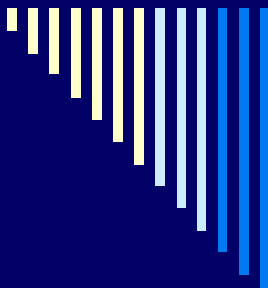
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The Bottom Line is That Gating  
Every Crossing Would Cost Lives,  
Not Save Lives Because Highway  
Departments Have More Cost-  
Effective Ways to Spend Limited  
Highway Dollars

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Then How Can Harvey Levine and  
His ilk Claim That Their  
Conclusions Are Based on an  
Economic Cost-Benefit Analysis?

They Can't !

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## Levine's Free Lunch Theory of Economics

- Railroads are obscenely profitable
  - They should therefore just pay all the costs of gating from their excess profits
  - It won't cost the taxpayers anything and the railroads will continue to prosper
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# The Fact is: Levine Has No Idea About the Costs or The Benefits

- In depositions, he has not known the cost of a gate
  - He is not familiar with the value of life literature
  - It does not appear that he has the FRA or other statistical model
  - He has never presented either a cost or a benefit number
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# The Facts Don't Support Levine's Economics

- ❑ The \$1.5 billion annual cost is equal to 55% of Class 1 combined net income
  - ❑ \$1.5 billion is 3.4% of gross freight income
  - ❑ If the competing roads face the same cost pressures either service will deteriorate or rates will go up
  - ❑ Either outcome results in more freight moving by truck and far more deaths
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# Consequences of the “Levine Plan”

- Hundreds of more deaths as highway funds are moved from more cost effective uses to gating railroad crossings
- Hundreds of more deaths as freight moves from rail to truck
- Thousands more injuries





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# Bringing Science to The Discussion

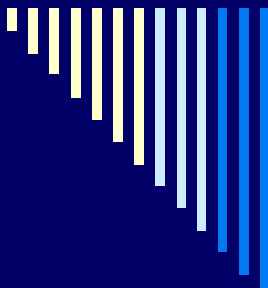
- ❑ Spectrum has developed a statistical model of crossing risk. It is like the FRA model but an order of magnitude more accurate
  - ❑ The FRA model is statistically flawed
  - ❑ The basic model says little more than “if there has been an accident here in the past, it is more likely that there will be one in the future.”
  - ❑ This approach gives both false positives and negatives and is unreliable
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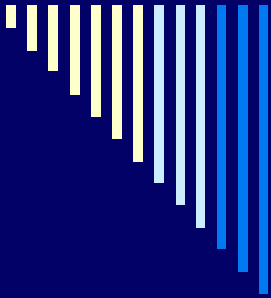


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## Bringing Science (cont.)

- We can estimate the hazard associated with any crossing in the FRA inventory and compute the cost of saving a statistical life
  - The statistical model quantifies crossing risk factors (similar to FRA)
  - We also have the FRA model
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- We also have a collection of safety statistics that can be used in cross-ex of those who claim crossings to be unsafe
  - Statistics can be used to refute *ipse dixit* to show that an “expert” opinion is not supported by scientific data
  - Showing the cost in lives of one issue schemes can turn the tables
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## ***Presented by:***

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