Asphalt Pavements that Carry Heavy Trucks

Technology Development in China and Opportunity for Transfer to the U.S.A.

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Roads In China

- China’s Expressway Network: 64,900 miles (2013)
U.S. and China Comparison

- Weather
- Truck Weight
American Truck Weights

Percentage Class 9 Tandem Axles

Axle Load (kips)
China Truck Weights

Axle Load (kips)

Percentage Class 9 Tandem Axles

Axle Load (kips)
Trucks in China
Aggregate Trucks

Gross Weight 185,000 lb.
U.S. and China Comparison

- Weather

  ![Weather Icon](image)

  Climate

- Truck Weight

  ![Truck Image](image)
High Air Temperature
Low Air Temperature
HIGHWAY DESIGN IN
Cement Treated Layers
Batch Plant (250 tph)
Haul Truck
Direct Dump into Paver
Vibratory and Pneumatic
Performance Issues
Rutting Can Be A Problem
U.S.A. - CHINA

PERPETUAL PAVEMENT EXPERIMENT
Construction Site

November 2004
TEST SECTION
THICKNESS

结构1 | 结构2 | 结构3 | 结构4 | 结构5
--- | --- | --- | --- | ---
5.0 | 5.0 | 5.0 | 4.0 | 4.0
7.5 | 7.5 | 7.5 | 6.0 | 5.0
10.5 | 9.0 | 9.0 | 8.0 | 6.0
10.5 | 9.0 | 9.0 | 8.0 | 6.0
9.0 | 7.5 | 7.5 | 15.0 | 18.0
7.5 | 30.0 | 30.0 | 20.0 | 18.0
30.0 | 30.0 | 20.0 | 30.0 | 30.0

材料说明:
- SMA-13, PG76-22
- AC-20, PG76-22
- AC-25, PG70-22
- LSPM-25, PG76-22
- FL-13, PG64-22
- FL-13, PG76-22
- 二灰碎石
- 二灰土
- 改善土

单位: cm
Gauge Placement
Paving Over Gauges
Completed Pavement
Tandem Axle Load

Tandem Axle Weight, Metric Tons

Design
Measured

97,000 lb
Measured
COMPARISON OF DESIGN STRAIN TO MAXIMUM MEASURED STRAIN

Horizontal Strain, microstrain

Section 1
Section 2
Section 3
Section 4
Section 5

Design
Measured
2008 Construction (2016)
SMA

- Basalt
Transportation is the KEY to Economic Activity
Federal Highway Act, 1956

The Interstate Highway System
FREIGHT

- Trucks Carry the Load
Truck Volumes
2007
Truck Volumes
2040

National Highway System Routes
- Interstate
- Non-Interstate
- FAF Trucks Volume/Day

Legend:
- Interstate
- Non-Interstate
- FAF Trucks Volume/Day

Miles
0 50,000 25,000 12,500
0 200 400 600

Map of the United States showing truck volumes for 2040.
Today’s Trucks in U.S.

- Cost per mile $1.27
- Cost per Ton-Mile $0.053
Canadian Size Truck

- Cost per mile $1.62
- Cost per Ton-Mile $0.034
Mexican Size Truck

- Cost per mile $1.72
- Cost per Ton-Mile $0.030
Less CO2

- 80,000 lbs. 75.7 g/t-mi
- 88,000 lbs. 72.0 g/t-mi
- 138,000 lbs. 56.5 g/t-mi
- 160,000 lbs. 51.8 g/t-mi

The BIGGER the truck the LOWER the CO₂

96 Million Tons
Critical Commerce Corridors

America’s Transportation Network
INTERSTATE 2.0

- Heavy Truck Lanes
- Light Vehicle Lanes
- Physical Separation
Critical Commerce Corridors

3C Network