R&D Briefing:

FAST/Heavy Axle Load Study

STUDY SITE:

Transportation Test Center, Association of American Railroads, Pueblo, Colorado

PURPOSE:

Quantify behavior of track components and rail cars under extremely heavy axle loads.

METHOD:

Comparison of current testing of 125 ton (39 kip wheel load) to data from earlier 100 ton (32 kip wheel load) test program. At test completion, a minimum of 160 million gross tons of traffic will have passed over the 2.7 mile, high tonnage loop at Pueblo.

Carrying a heavy load.

In an effort to maintain a competitive edge in the shipping industry, U.S. railroads are investigating the feasibility of increasing axle loads by 20%, thus allowing greater amounts of freight to be hauled.

As to be expected, such an increase has raised some concerns about the effects on the performance and stability of track components, including wood ties.

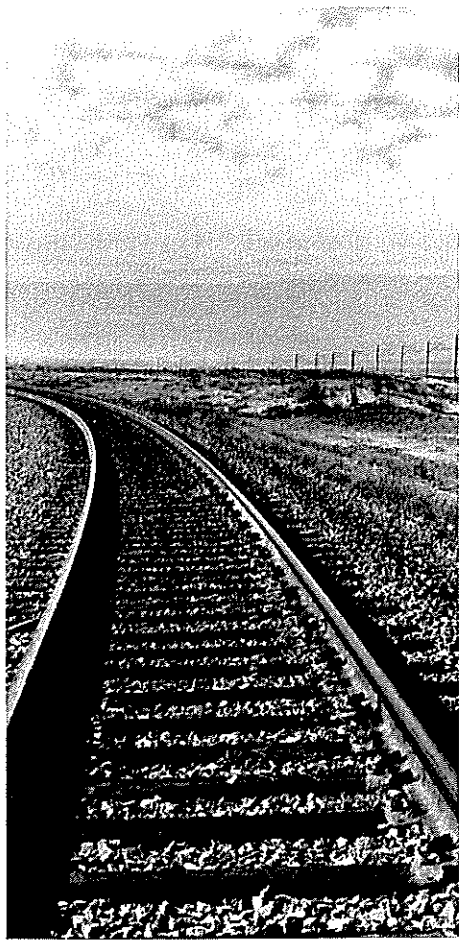
By the end of the program, at least 160 million gross tons of traffic will have been placed on the 2.7 mile track loop...

In response to these concerns, the AAR and FRA are currently conducting a critical study that will quantify the effects of heavier car loads on track structures and on rail cars.

Started in August of 1988, the $10 million, 16-month Heavy Axle Load (HAL) program will help determine the change in track deterioration rate and the costs that accompany a 20% increase in static axle loads.

By the end of the program, at least 160 million gross tons (MGT) of traffic will have been placed on the 2.7 mile track loop by a train of high-sided gondola cars, loaded with 125 tons of simulated freight. There is also a strong possibility that the program will be extended for an additional 100 MGT.

The following preliminary observations regarding ties and fasteners are based on about 15 weeks of operations, and 10,880 miles test train distance. A total of 46.5 MGT had passed over the track at observation time, although much of the data available from AAR represented the initial 30 to 40 MGTs.



Wood tie and fastener performance.

In general, wood ties appear to be performing satisfactorily. No evidence of unusual plate cutting was noted. The fact that wood ties are performing with no remarkable occurrences indicates that these ties are meeting standard requirements.

A measurable amount of tie movement has been noted, particularly where the combination of cut spikes and anchors are used, in sections 3, 7, and 25. Some longitudinal rail movement has also been noted in the same areas.

In the very early stages of the test, all elastic rail-fastening systems provided greater lateral rail stiffness and restraint against gage-widening than did cut spikes. However, one system had to be removed from softwood ties due to loss of holddown.

After 5 MGTs, two types of synthetic tie plugs provided greater resistance to spike pull-out than wood plugs, and two types provided less.

Two types of elastic rail fasteners also exhibited some loss of toe load. One type had fractured.

Concrete tie and fastener performance.

According to AAR Research Highlights of May 1989, four concrete ties had developed surface cracks at or near the center. Fastening systems were performing satisfactorily.

Results and reports.

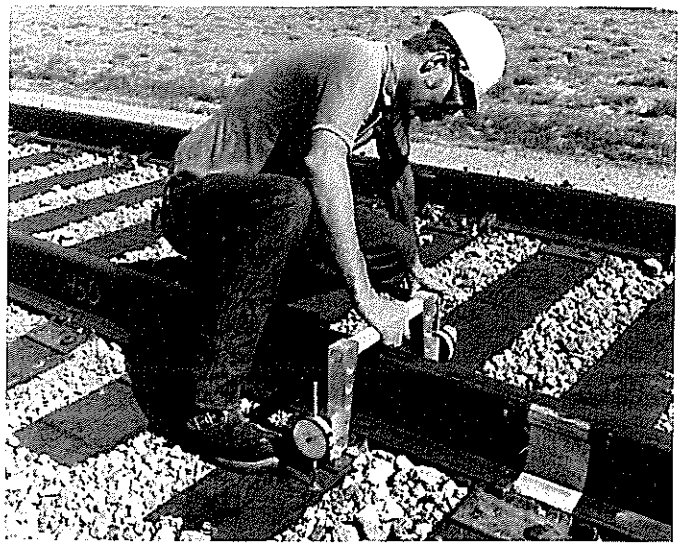
The above findings are based on preliminary findings at approximately 35 MGT. Additional interim reports regarding the FAST/HAL study will be made available after 80-100 MGTs. A formal FAST report covering wood ties and fasteners and numerous other experiments will be issued by the AAR at the conclusion of the program (April 1990).

To receive these reports, fill out and return the accompanying reply card. The Railway Tie Association will send you the reports as soon as they are available.

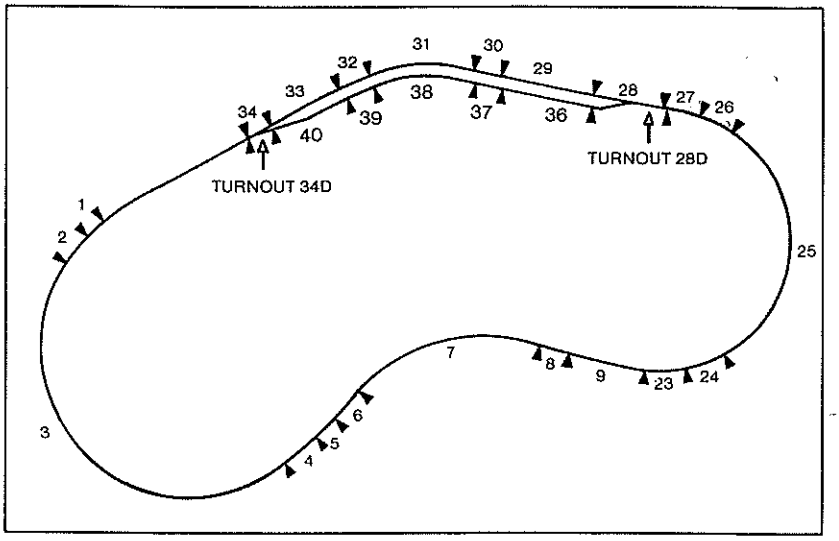
Note:

The 1000 creosote treated wood ties for this program were donated by the Railway Tie Association (RTA). All of the direct fixation fastening systems were donated by respective manufacturers/suppliers.

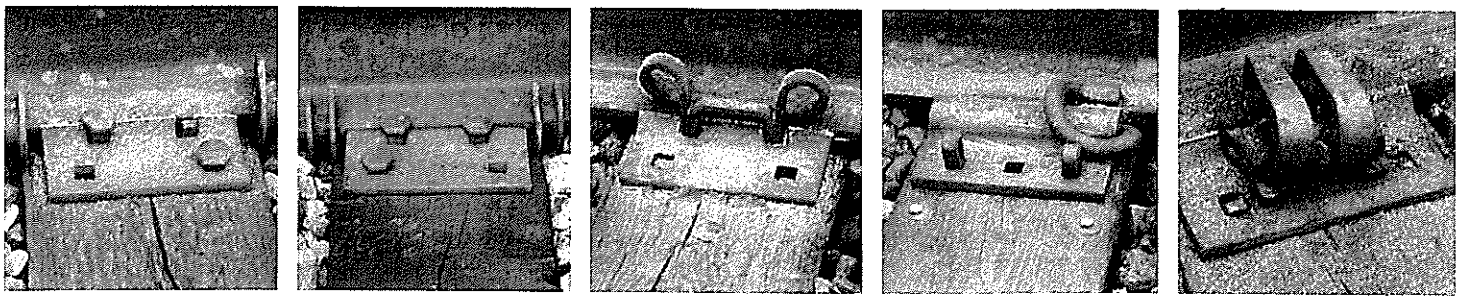
These observations come from a combination of AAR reports and RTA-sponsored inspections.



Technician using a tie plate cutting fixture to collect data.



High tonnage loop (HTL) showing test sections.



teners used in the FAST/HAL study included ft to right) two conventional cut spikes, three cut spikes, double elastic fastener, Pandrol plate, clip and hairpin spikes and McKay elastic fastener.