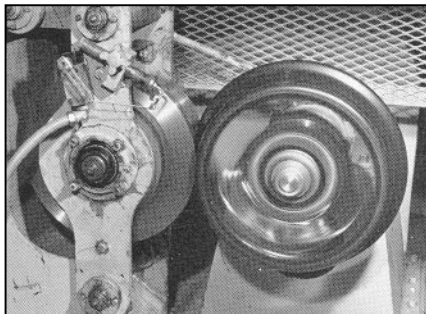


Nolan wheel durability tested by an independent laboratory.

To establish the durability and expected wheel life of The Nolan Company's special ductile alloy wheels, The Nolan Company engaged an independent laboratory to test 16" diameter pressed steel wheels of 5/16" material and Nolan's cast wheels under identical conditions. The results of these tests are tabulated below. A copy of the complete report is available on request.

Straight Radial Fatigue Tests



Test set-up.

The laboratory test shown at left was set up to run all wheels at 25 MPH while engaged with a rail that conformed to A.R.E.A Standards. The test results are shown below.

Straight Radial Fatigue Test Results (comparison)		
Type of Wheel	Under 2,500 lb. Load	Under 5,000 lb. Load
16" dia. 5/16" pressed steel wheel	Failed at 31.4 hrs.	Failed at 3.5 hrs.
16" dia. Nolan special ductile alloy cast wheel	Not tested.	No failure after 100.0 hrs.



Nolan special ductile alloy wheel after 100.0 hours under 5,000-lb. load shows normal wear.



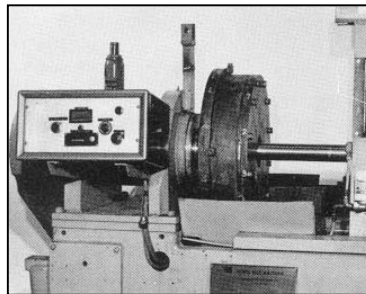
Pressed steel wheel after 31.4 hours under 2,500-lb. load shows EXTENSIVE wear.



Pressed steel wheel after 3.5 hours under 5,000-lb. load shows EXTENSIVE wear.

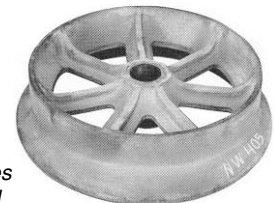
Rotary Fatigue Tests

The laboratory test shown at right simulates a wheel running on a curve at 25 M.P.H. under a 2,500-lb. load. It measures the wheel's capabilities under continuous side loading. A limit switch shut down the test at the first sign of failure to keep from destroying the wheel. The test results are shown below.

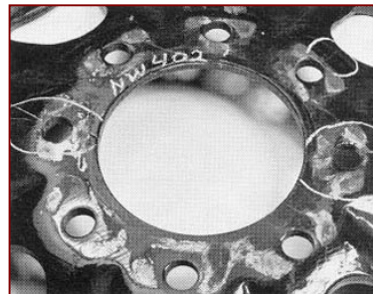


Test set-up.

Nolan special ductile alloy wheel after 300,000 cycles shows normal wear.



Rotary Fatigue Test Results (comparison)	
Type of Wheel	Under 2,500-lb. Load
16" dia. 5/16" pressed steel wheel	Failed at 66,700 cycles.
16" dia. Nolan special ductile alloy cast wheel	No failure after 300,000 cycles.



Pressed steel wheel after 66,700 cycles — cracks in steel.

Drop Test

The laboratory set up a test that dropped a weight against the rim of a Nolan special ductile alloy wheel. The test simulated the dropping of a 1,000 lb. push cart a distance of two feet. The test resulted in no damage to the Nolan wheel.