



# Innalytical™ Solutions

*Bringing Innovation to Engineering Challenges*

Rhino Rails, LLC  
105 Thackston Rd.  
Duncan, SC 29334

March 29, 2010

Mr. Bourland,

As requested, I am providing a summary of the guard rail tests I observed at your facility on March 26, 2010. The purpose of the test was to confirm the impact rating of Rhino Rails's guard rail system – both of the existing design and for a new design being considered. The system is rated to withstand an impact of 10,000 pounds at 4 miles per hour.

For each test, Rhino Rails's fork truck was run into the center of a ten foot guard rail section mounted to two support posts. The approximate weight of the fork truck is 8,700 pounds. An additional 2,000 pound load was placed on the forks of the truck during testing in order to exceed the test specifications. Video recordings were made of the test with extra support posts placed behind the test for a distance reference. The time required for the fork truck to travel the last three feet before impact was used to calculate the speed of the fork truck at impact.

Two tests were observed. For the first test the support posts were constructed with the current design support posts. During the first test the guard rail remain attached to the support posts during impact. The guard rails deflected approximately 12 inches at its center during the impact. It was determined, using the video recording, that the speed of the fork truck at the time of impact was approximately 6 miles per hour.

For the second test the support posts were constructed with the new design support posts. During the second test the guard rail remain attached to the support posts during impact. The guard rails deflected approximately 13.5 inches at its center during the impact. It was determined, using the video recording, that the speed of the fork truck at the time of impact was approximately 5.5 miles per hour.

The attached sketch shows the guard rail before and after the impact.

Based on my observations, the guard system can be certified to withstand an impact of 10,000 pounds at 4 miles per hour with either the current design with welded nuts, or with the flow drilled mounting holes. Both systems remained intact during the tests which were conducted with more weight than was specified and at a higher speed than was specified.

Sincerely,

Paul Terpstra  
President



Sketch of guard rail before and after impact  
(Deflections are specified in report)

