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IMPACT TEST REPORT

Disposable Inflatable Dunnage Bags Used to Control Lengthwise Movement of Cased Goods in TOFC – CargoTuff

NOTE: THIS TEST REPORT DOES NOT CONSTITUTE APPROVAL OR DISAPPROVAL OF THE EQUIPMENT, METHOD OR MATERIAL TESTED

TEST REPORT: FI 16-15

July 30, 2015

**Report by:
Tom Feltault
Director DPLS**

**Damage Prevention and Loading Services
AAR/TTCI
55500 DOT Road
Pueblo, CO 81001**



July 30, 2015

REPORT OF IMPACT TEST FI 16-15

SUBJECT: **Disposable Inflatable Dunnage Bags Used to Control Lengthwise Movement of Cased Goods in TOFC - CargoTuff**

SYNOPSIS: An impact test was conducted to evaluate the performance of two level 1 polyethylene/polypropylene pneumatic dunnage bags in a trailer load of palletized case goods. The palletized case goods were loaded in an intermodal trailer according to Method F-2 of the AAR Intermodal Loading Guide. The load was secured with two 48 in. high x 96 in. long x 22 in. wide level 1 air bags. The load successfully completed impact testing.

BACKGROUND: Larry Flora, CargoTuff, requested that AAR testing be conducted on a load of palletized case goods using two (2) 48 in. high x 96 in. long x 22 in. wide “Square” Level 1 Polyethylene/Polypropylene Pneumatic Dunnage Bags. The purpose of this test was to evaluate the use of two “Square” Level 1 Polyethylene/Polypropylene Pneumatic Dunnage Bags to control lengthwise load movement in 12 in. to 24 in. crosswise voids with application per Method F-2 of the AAR Intermodal Loading Guide.

Testing was conducted on July 27, 2015 at the Transportation Technology Center, Pueblo, Colorado.

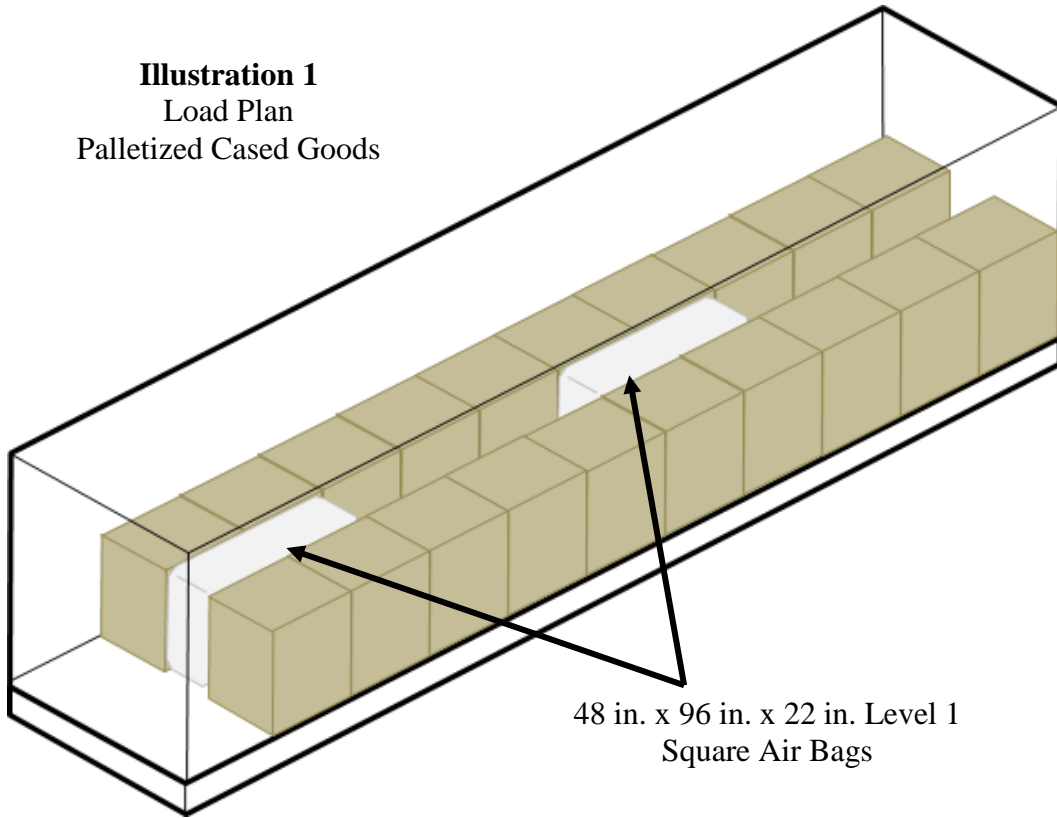
In attendance during testing were:

Larry Flora, CargoTuff
David Hendrixon, TTCI/AAR
Craig Millbauer, TTCI/AAR
Rama Maram, TTCI/AAR

LOAD DESCRIPTION: Trailer XTRZ 240513 (45 ft. x 102 in.), equipped with a wood floor and sidewalls, was loaded with 20 stretch wrapped units of cased canned olives. Unit dimensions were 48 in. x 40 in. x 50 in. high and weighed approximately 2,150 lbs. each. The units were loaded lengthwise in two rows of 10 stacks. The rows were positioned against each sidewall starting at the nose of the trailer.

Two level 1 “square” air bags, measuring 48 in. high x 96 in. long x 22 in. wide, were installed in the center void between the rows of units. One air bag was positioned between stacks 4 and 5; the second air bag was positioned between stacks 9 and 10 at the rear of the load. Both air bags were inflated to 2.5 psig. The voids filled by the air bags measured between 22 in. and 24 in. after inflation. The load weighed approximately 43,000 lbs. See the following illustration.

Illustration 1
Load Plan
Palletized Cased Goods



TEST PARAMETERS: The test car with the trailer was released from a predetermined location for the appropriate target speed on a 0.8% grade track. The test car was impacted into an anvil string consisting of four empty cars: DRGW 60932 (80,500lbs); DRGW 60971 (81,100lbs); CR 433432 (49,600lbs); and MP 582911 (57,900lbs); for a combined weight of approximately 269,100 lbs. (122.10 metric tons). All the cars in the anvil string had standard draft gears, with the airbrakes set on all cars, and the handbrakes set on the first and last cars. See Illustration 2.

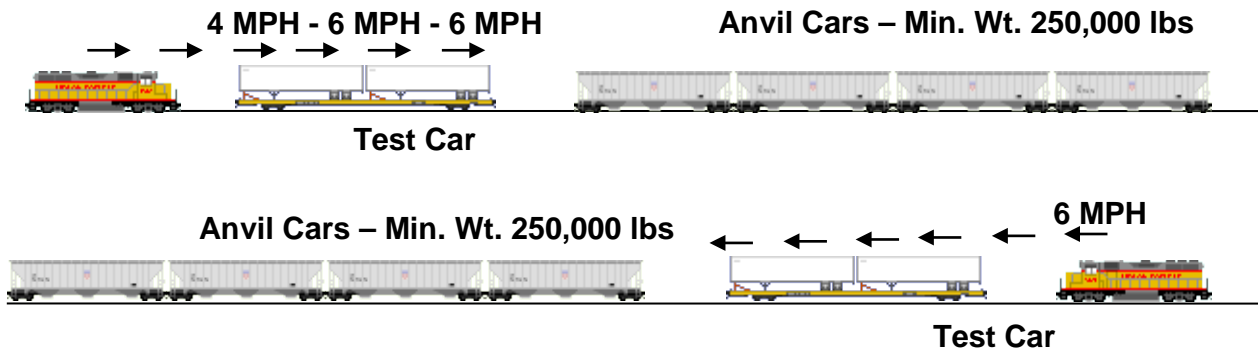


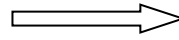
Illustration 2
Typical AAR Impact Configuration, Closed Car / TOFC – COFC

A hand held RailMaster Radar Gun Model CR-1k was used for the speed measurement.

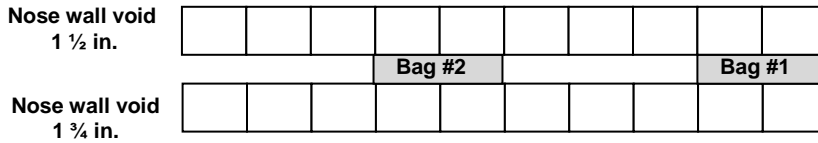
The starting measurements from the end of the pallets to the trailer doors were 49 ½ in. on the right door and 45 in. on the left door.

RESULTS:

1st impact at 4.0 mph towards the doors:



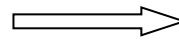
4.1 mph



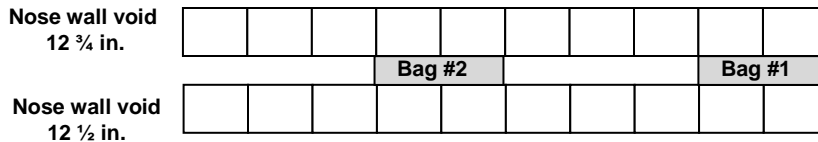
Inches to right door
49 ¼ in.

Inches to left door
45 in.

2nd impact at 6.0 mph towards the doors:



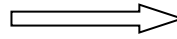
6.1 mph



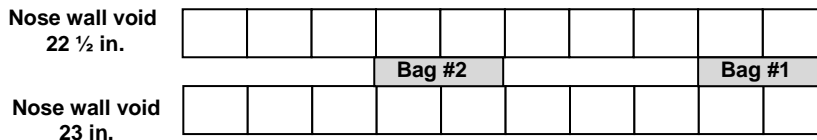
Inches to right door
38 ½ in.

Inches to left door
36 ½ in.

3rd impact at 6.0 mph towards the doors:



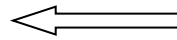
6.1 mph



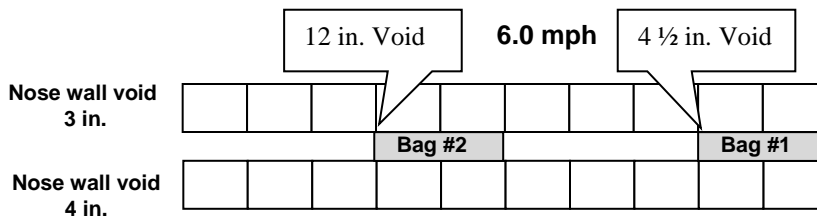
Inches to right door
28 ½ in.

Inches to left door
26 ¾ in.

4th impact at 6.0 mph towards the nose:



6.0 mph



Inches to right door
29 in.

Inches to left door
27 ¼ in.

The first 3 stacks shifted against the front end wall. A 12 in. void developed between stacks 3 and 4. A 4 ½ in. void developed between stacks 8 and 9. The void at the doorway enlarged ½ in.

CONCLUSION: The loading and securement method performed as intended.

DISCUSSION: The securement method performed well in controlling lengthwise movement. The 12 in. and 4 ½ in. voids that developed between the pallets during the reverse impact are comparable to what has been observed in previous tests of this loading method.

Void fillers normally required between the stacks not braced by the air bags were left out for the sake of convenience.

TTCI would like to thank CargoTuff for conducting this test.

Tom Feltault
Director
Damage Prevention and Loading Services

Test Photos



View of load from trailer doors.



Longitudinal void space of 23 1/2 in. created after the 3 forward impacts



Longitudinal void space of 4 ½ in. between pallets stack 8 and 9 created from the reverse 6 mph impact.



Longitudinal void space of 12 in. between pallets stack 3 and 4 created from the reverse 6 mph impact.



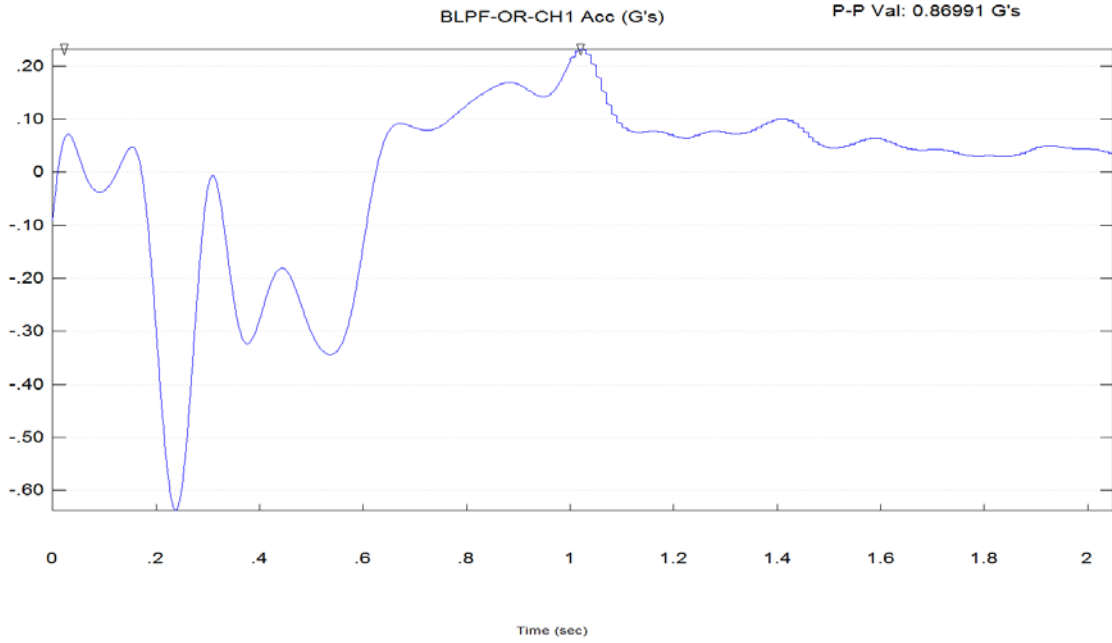
Longitudinal void space of 3 in. between the 1st pallet and end wall on the right side after the reverse 6 mph impact.



Longitudinal void space of 4 in. between the 1st pallet and end wall on the left side after the reverse 6 mph impact.

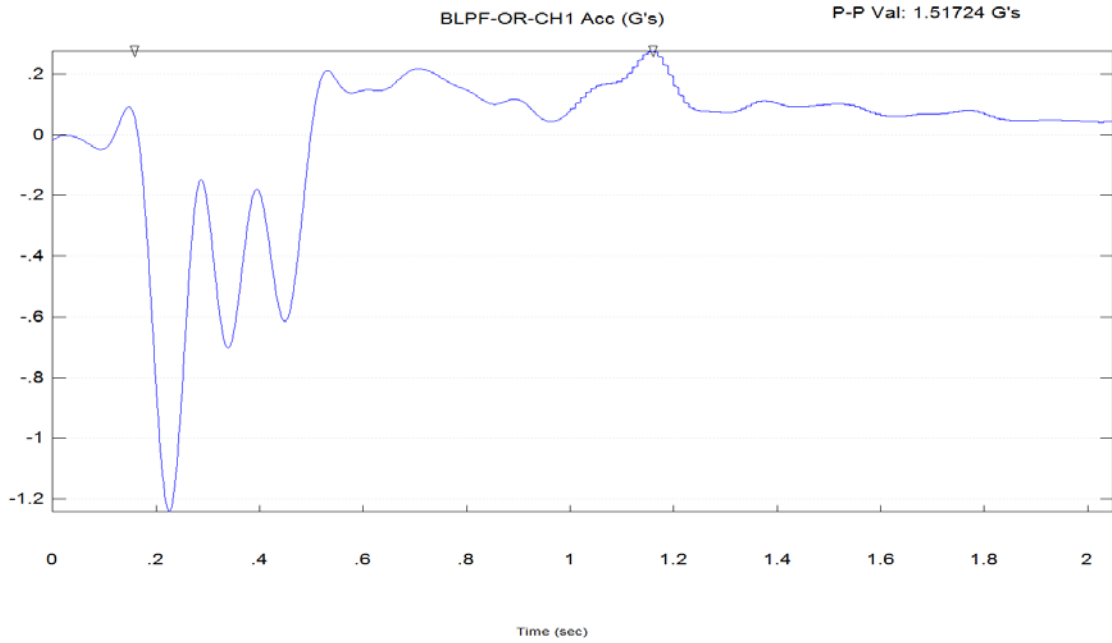
Acceleration Data

441 4MPH 1183.csv

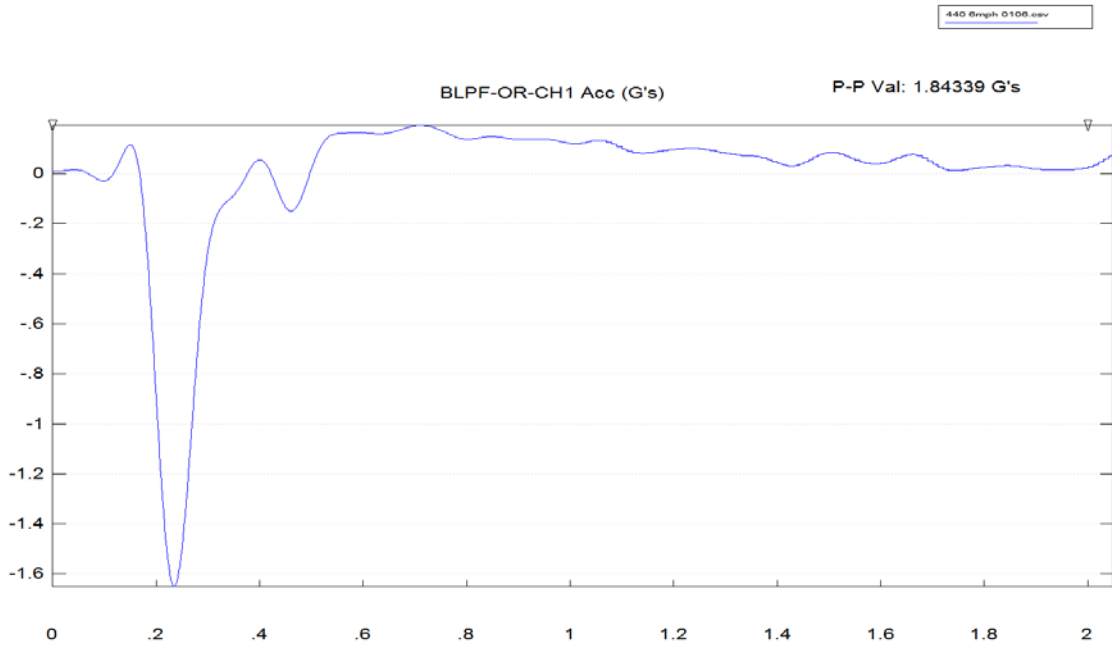


4 MPH Impact

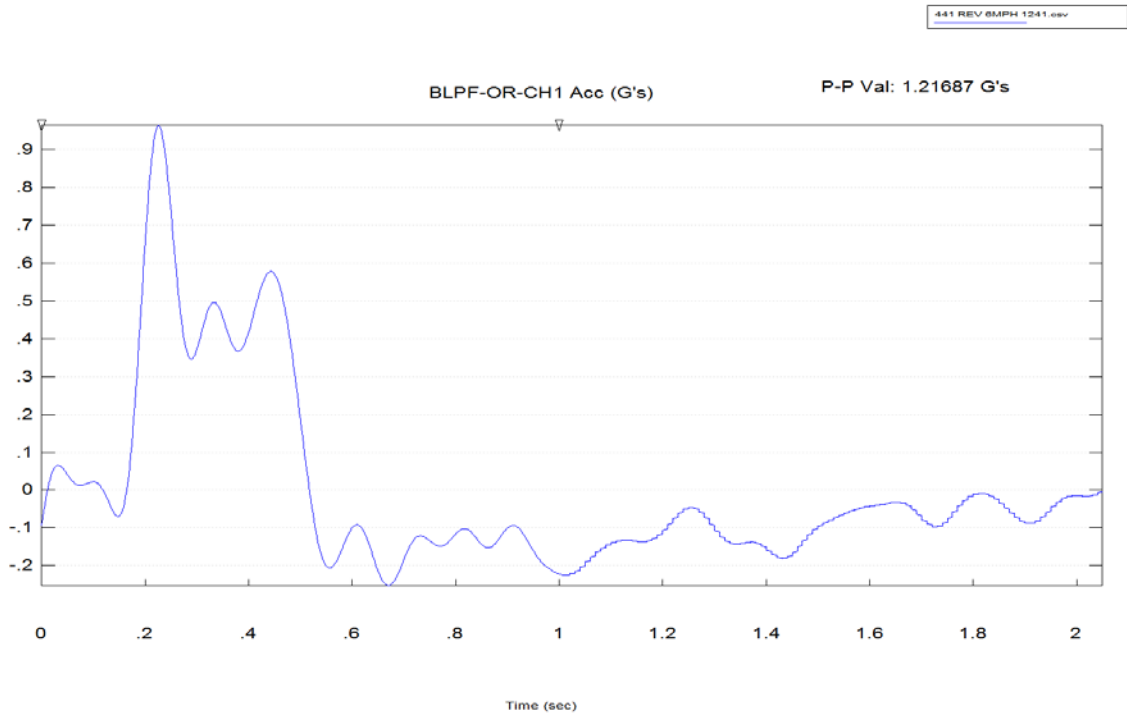
441 6MPH 1189.csv



6 MPH Impact



6 MPH Impact



Reverse 6 MPH Impact