

DROPBEAR Test Plan

Test Specimens:

- Fixed-Free Beam
 - Beam Length: 500 mm
 - Beam Width: 51.77 mm
 - Beam Thickness: 6.70 mm
 - Beam Material: AISI 4140 Steel
 - Beam Density: 7850 kg/m³

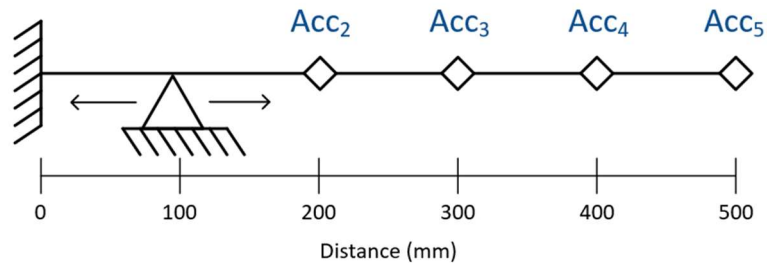
Sensors:

- High Speed Camera
 - Model: Phantom v1612
 - Frame rate: 30000 FPS
 - Resolution: 1280 x 400
- Impact Hammer
 - Model: Brüel & Kjær Sound & Vibration TYPE 8206-001
 - Sensitivity: 11.40 mV/N
- Accelerometers
 - Accelerometers are PCB Piezotronics Model 353B17
 - Acc1
 - Serial Number: 139378
 - Sensitivity: 10.60 mV/g
 - Location: 400 mm from free end (Measured 99.94 mm from fixed end)
 - Acc2
 - Serial Number: 139351
 - Sensitivity: 10.68 mV/g
 - Location: 300 mm from free end (Measured 197.88 mm from fixed end)
 - Acc3
 - Serial Number: 139673
 - Sensitivity: 10.34 mV/g
 - Location: 200 mm from free end (Measured 297.88 mm from fixed end)
 - Acc4
 - Serial Number: 127691
 - Sensitivity: 10.24 mV/g
 - Location: 100 mm from free end (Measured 397.88 mm from fixed end)
 - Acc5
 - Serial Number: 127687
 - Sensitivity: 10.97 mV/g (10.87 used, corrected in data processing)
 - Location: 0 mm from free end (Measured 491.31 mm from fixed end)

Test Configurations

I. Moving Roller Tests

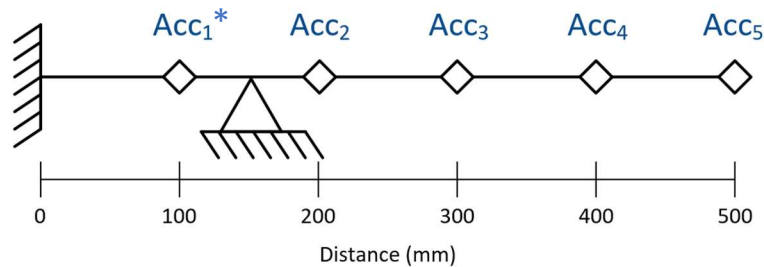
- Roller travels from 48 mm to 168 mm
- Acc1 removed



- Slow movement
 - MR-Slow-i (7/25/19 9:43 AM)
 - MR-Slow-ii (7/25/19 9:43 AM)
 - MR-Slow-iii (7/25/19 9:43 AM)
- Fast movement
 - MR-Fast-i (7/23/19 8:47 AM, Filmed)
 - MR-Fast-ii (7/25/19 9:47 AM)
 - MR-Fast-iii (7/25/19 9:47 AM)
 - MR-Fast-iv (7/25/19 9:46 AM)
- Fast movement before mass drop
 - MR-MD-i-c (7/25/19 9:56 AM)
 - MR-MD-ii-c (7/25/19 9:57 AM)
 - MR-MD-iii-c (7/25/19 9:58 AM)
- Fast movement after mass drop
 - MR-MD-i-d (7/23/19 9:33 AM, Filmed)
 - MR-MD-ii-d (7/25/19 10:07 AM)
 - MR-MD-iii-d (7/25/19 10:08 AM)
 - MR-MD-iv-d (7/25/19 10:10 AM)
- Fast movement before rubber hammer hit
 - MR-Impact-i-e (7/25/19 10:13 AM)
 - MR-Impact-ii-e (7/25/19 10:13 AM)
 - MR-Impact-iii-e (7/25/19 10:15 AM)
- Fast movement after rubber hammer hit
 - MR-Impact-i-f (7/25/19 10:20 AM)
 - MR-Impact-ii-f (7/25/19 10:21 AM)
 - MR-Impact-iii-f (7/25/19 10:21 AM)

II. Tests without changing boundary condition or mass drop:

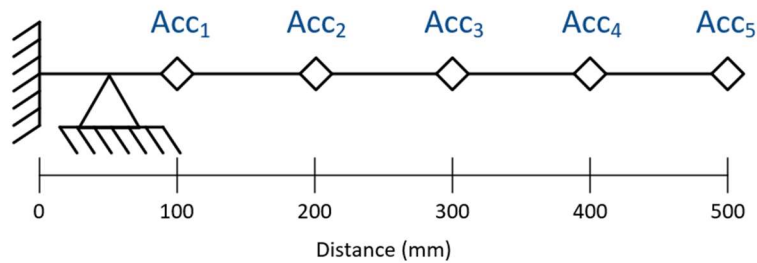
a. Fixed-Roller Beam with Roller 150mm from Fixed End



* Acc₁ was attached on the top of the beam.
Other accels were attached on the bottom.

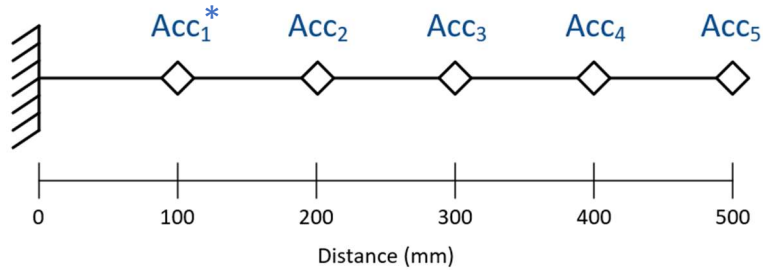
- Rubber tip striking at the free end (500 mm from fixed end), with three repetitions:
 - XR150-Rub500-i (7/23/19 10:25 AM, Filmed)
 - XR150-Rub500-ii (7/23/19 5:57 PM)
 - XR150-Rub500-iii (7/23/19 5:58 PM)
 - XR150-Rub500-iv (7/23/19 6:01 PM)
 - XR150-Rub500-v (7/23/19 6:02 PM)
- Rubber tip striking at 300 mm from the fixed end, with three repetitions:
 - XR150-Rub300-i (7/23/19 5:46 PM)
 - XR150-Rub300-ii (7/23/19 5:47 PM)
 - XR150-Rub300-iii (7/23/19 5:50 PM)
- Plastic tip striking at the free end (500 mm from fixed end), with three repetitions:
 - XR150-Plst500-i (7/23/19 12:07 PM, Filmed)
 - XR150-Plst500-ii (7/23/19 12:04 PM)
 - XR150-Plst500-iii (7/23/19 6:04 PM)
 - XR150-Plst500-iv (7/23/19 6:05 PM)
 - XR150-Plst500-v (7/23/19 6:06 PM)
- Plastic tip striking at 300 mm from the fixed end, with three repetitions:
 - XR150-Plst300-i (7/23/19 6:06 PM)
 - XR150-Plst300-ii (7/23/19 6:07 PM)
 - XR150-Plst300-iii (7/23/19 6:07 PM)
 - XR150-Plst300-iv (7/23/19 6:08 PM)
 - XR150-Plst300-v (7/23/19 6:08 PM)

b. Fixed-Roller Beam with Roller 48 mm from Fixed End



- Rubber tip striking at the free end (500 mm from the fixed end), with three repetitions:
 - XR50-Rub500-i (7/25/19 10:44 AM)
 - XR50-Rub500-ii (7/25/19 10:45 AM)
 - XR50-Rub500-iii (7/25/19 10:46 AM)
 - XR50-Rub500-iv (7/25/19 10:45 AM)
- Rubber tip striking at 250 mm from the fixed end, with three repetitions:
 - XR50-Rub250-i (7/25/19 10:51 AM)
 - XR50-Rub250-ii (7/25/19 10:51 AM)
 - XR50-Rub250-iii (7/25/19 10:51 AM)
 - XR50-Rub250-iv (7/25/19 10:52 AM)
 - XR50-Rub250-v (7/25/19 10:52 AM)
- Plastic tip striking at the free end (500 mm from the fixed end), with three repetitions:
 - XR50-Plst500-i (7/25/19 11:01 AM)
 - XR50-Plst500-ii (7/25/19 11:01 AM)
 - XR50-Plst500-iii (7/25/19 11:06 AM)
 - XR50-Plst500-iv (7/25/19 11:06 AM)
 - XR50-Plst500-v (7/25/19 11:06 AM)
- Plastic tip striking at 250 mm from the fixed end, with three repetitions:
 - XR50-Plst250-i (7/25/19 11:10 AM)
 - XR50-Plst250-ii (7/25/19 11:11 AM)
 - XR50-Plst250-iii (7/25/19 11:11 AM)
 - XR50-Plst250-iv (7/25/19 11:11 AM)
 - XR50-Plst250-v (7/25/19 11:11 AM)

c. Fixed-Free Beam with No Roller

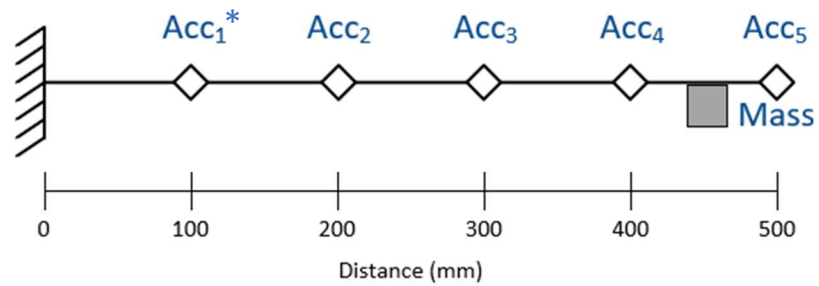


* Acc_1 was attached on the top of the beam.
Other accels were attached on the bottom.

- Rubber tip striking at the free end (500 mm from fixed end), with three repetitions:
 - XF-Rub500-i (7/23/19 4:15 PM)
 - XF-Rub500-ii (7/23/19 4:18 PM)
 - XF-Rub500-iii (7/23/19 4:21 PM)
- Rubber tip striking at 350 mm from the fixed end, with three repetitions:
 - XF-Rub350-i (7/23/19 4:23 PM)
 - XF-Rub350-ii (7/23/19 4:26 PM)
 - XF-Rub350-iii (7/23/19 4:30 PM)
- Rubber tip striking multiple times at different locations:
 - XF-Rub150-Rand (7/23/19 4:46 PM)
 - XF-Rub200-Rand (7/23/19 4:49 PM)
 - XF-Rub250-Rand (7/23/19 4:39 PM)
 - XF-Rub300-Rand (7/23/19 4:48 PM)
 - XF-Rub350-Rand (7/23/19 4:36 PM)
 - XF-Rub400-Rand (7/23/19 4:47 PM)
 - XF-Rub500-Rand (7/23/19 4:53 PM)
 - XF-Rub500+350+500+350-Rand (7/23/19 4:37 PM)
- Plastic tip striking at the free end (500 mm from the fixed end), with three repetitions:
 - XF-Plst500-i (7/23/19 1:40 PM, Filmed)
 - XF-Plst500-ii (7/23/19 3:35 PM)
 - XF-Plst500-iii (7/23/19 3:42 PM)
- Plastic tip striking at 350 mm from the fixed end, with three repetitions:
 - XF-Plst350-i (7/23/19 2:43 PM, Filmed)
 - XF-Plst350-ii (7/23/19 3:49 PM)
 - XF-Plst350-iii (7/23/19 4:03 PM)

III. Mass Drop Tests

- No pin



* Acc_1 was attached on the top of the beam.
Other accels were attached on the bottom.

- Mass drop no hammer impact
 - MD-No-Impact-I (7/23/19 5:06 PM)
 - MD-No-Impact-ii (7/25/19 11:23 AM)
 - MD-No-Impact-iii (7/25/19 11:23 AM)
- Mass drop after rubber hammer impact
 - MD-Impact-i (7/25/19 11:25 AM)
 - MD-Impact-ii (7/25/19 11:27 AM)
 - MD-Impact-iii (7/25/19 11:28 AM)