



Multi-Axial S&R and Durability Test Systems

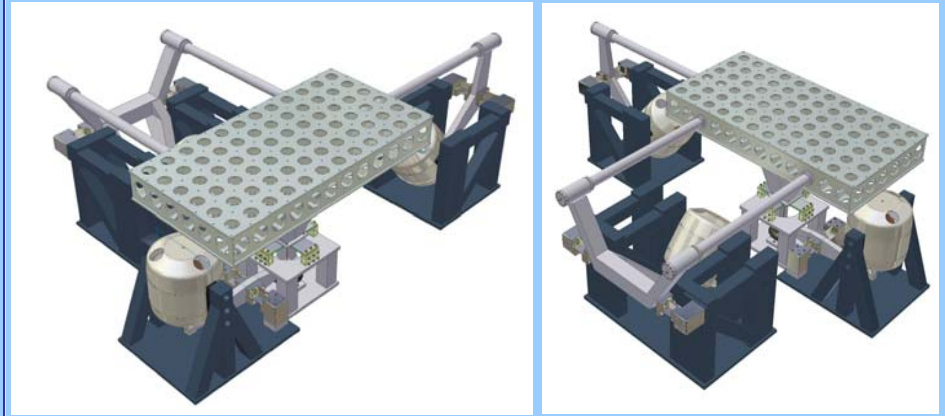
Quiet for S&R – Powerful for Durability – Multi-axial for Realism

MB Dynamics offers many options for performing squeak & rattle and durability tests on the same vibration equipment. Benefits include higher lab productivity, fewer hassles juggling test items and schedules, shorter test times, and no hydraulics.

Simultaneous 1+2 DOF System



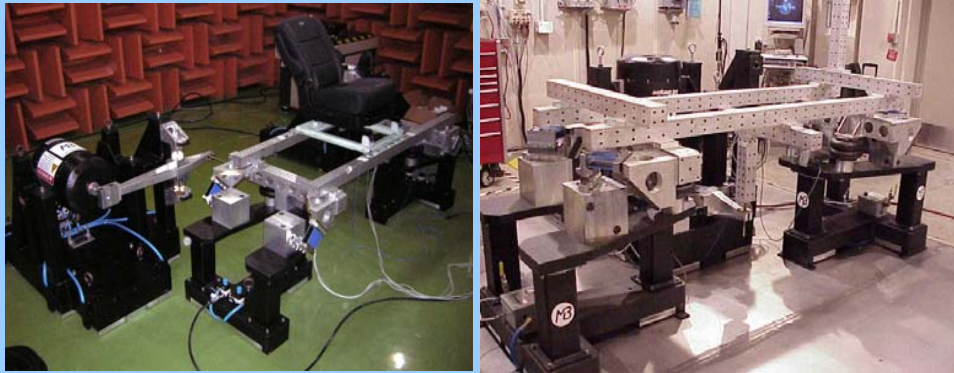
Simultaneous 3+2 DOF System



- ✓ 5 simultaneous axes of vibration in 2 test cycles:
 - Vertical is controlled in 1st cycle, pitch and fore-aft are coupled
 - Vertical is controlled in 2nd cycle, roll and lateral are coupled
- ✓ Tests: seat, cockpit, door module, sunroof, console, steering
- ✓ Excites dominant directions: vertical, fore-aft, lateral, pitch, roll
- ✓ Quiet: <35 dBA Background Noise inside <30 dBA Quiet Room
- ✓ Complies with Ford S&R DV/PV Outline, Seats & IPs, Prod. Verif.
- ✓ Complies with PSA spec PSA STE9646364399 and BMW S&R spec
- ✓ Use inside environmental chamber: -30 °C to 50 °C
- ✓ Fore-aft motion fixed at 45% of vertical at mounting table
- ✓ 5 – 100 Hz frequency range for S&R and durability, max 250 Hz
- ✓ Durability Payload, 165kg, 2 BLACKs: 0.8 gRMS and 1.3 g Peak
- ✓ Durability Payload, 224kg, 2 BLACKs: 0.6 gRMS and 1.1 g Peak
- ✓ Durability tests use air cooling; SILVERs deliver higher forces

- ✓ 5 simultaneous axes of vibration in 1 test cycle:
 - Vertical, fore-aft, and lateral are controlled
 - Pitch coupled with fore-aft; roll coupled with lateral
- ✓ Tests: seat, cockpit, door module, sunroof, console, steering
- ✓ Excites dominant directions: vertical, fore-aft, lateral, pitch, roll
- ✓ Quiet: <35 dBA Background Noise inside <30 dBA Quiet Room
- ✓ Complies with Ford S&R DV/PV Outline, Seats & IPs, and Ford Seat Durability Spec ST-0009 & BMW S&R spec and GMW14011
- ✓ Use inside environmental chamber: -30 °C to 50 °C
- ✓ Pitch and roll motions are fixed by geometry of mounting table
- ✓ 5 – 100 Hz frequency range for S&R and durability, max 250 Hz
- ✓ Durability Payload, 165kg, 3 SILVERs: 1.4 gRMS and 2.1 g Peak
- ✓ Durability Payload, 224kg, 3 SILVERs: 1.2 gRMS and 1.8 g Peak
- ✓ Durability tests use air cooling of SILVERs
- ✓ Less \$\$, quiet for S&R, and easier to use than MAST or CUBE

Sequential 3 DOF System



- ✓ 3 sequential axes of vibration in 3 test cycles:
 - Vertical is excited as dominant direction of road inputs
 - Fore-aft is excited without moving test item, only Energizer (s)
 - Lateral is excited without moving test item, only Energizer (s)
- ✓ Tests: seat, cockpit, door module, sunroof, console, steering
- ✓ Excites dominant directions: vertical, fore-aft, lateral
- ✓ Complies with GMW 14011, GMW 7293TP & GMW 14188
- ✓ Quiet: 1.5 sones Background Noise (GM) inside <30 dBA Room
- ✓ Quiet: for making objective measurements as in GMW 14011
- ✓ Use inside environmental chamber: -30 °C to 50 °C
- ✓ 5 – 100 Hz frequency range for S&R and durability
- ✓ Durability Payload, 165kg, 2 BLACKs: 1.6 gRMS and 2.7 g Peak
- ✓ Durability Payload, 224kg, 2 BLACKs: 1.2 gRMS and 2.1 g Peak
- ✓ Durability tests use 2 cooled BLACKs; SILVERs give more force

Vertical 1 DOF System



- ✓ 1 axis of vibration: vertical as dominant direction of road inputs
- ✓ Tests: seat, door module, sunroof, console, steering, HVAC
- ✓ Quiet: <35 dBA Background Noise inside <30 dBA Quiet Room
- ✓ Complies with PSA spec PSA STE9646364399
- ✓ Use inside environmental chamber: -30 °C to 50 °C
- ✓ 5 – 100 Hz frequency range for S&R and durability, max 250 Hz
- ✓ Durability Payload, 165kg, BLACK: 0.5 gRMS and 0.8 g Peak
- ✓ Durability Payload, 224kg, BLACK: 0.4 gRMS and 0.6 g Peak
- ✓ Durability Payload, 165kg, SILVER: 1.2 gRMS and 1.8 g Peak
- ✓ Durability Payload, 224kg, SILVER: 0.9 gRMS and 1.4 g Peak
- ✓ Durability tests use air cooling of Energizer BLACK or SILVER