

Implementation of the Ford-recommended JIT Plant S&R Process using Shaker Tables

S&R GLOBAL KNOWLEDGE TEAM

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Over 21 years of experience with leading seating supplier, Johnson Controls, Inc. in advanced product development and product validation. As Subject Matter Technical Expert (SMTE) for NVH Engineering at Johnson Controls, Mike had design sign-off responsibility for S&R prevention on all seating programs developed in North America. During product validation, he assisted the product engineers to identify root cause and corrective actions for DV, PV, and launch S&R issues. He also worked closely with the JCI plant quality organizations and Ford's S&R group to implement Ford's Squeak and Rattle (S&R) Prevention Process using MB Dynamics S&R shaker test systems at seating JIT plants around the globe.

Education:

MSME, Purdue University

BSME, University of Notre Dame

Ed Peterson

Director, Application Engineering

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Since the early 90's Ed has been a pioneer developing S&R test methods; innovating practical and cost-effective S&R equipment and software; acquiring road load data; developing S&R drive files; training in S&R test procedures; authoring a chapter in a S&R book; and being a reliable source of S&R applications know-how for OEMs and suppliers. Ford selected Ed and MB to assist in implementing an Instrument Panel PV and Early Build S&R Process at an IP JIT plant. Over 5 years Ed performed S&R tests and used N10 Loudness plus subjective evaluations to audit IPs during road-like vibration to diagnose, identify and root-cause S&Rs and to implement ICA and PCA actions.

Education:

MSME, University of Cincinnati

BSME, University of Cincinnati

INSTALLED BASE SPANS THE GLOBE

MB Dynamics has amassed an impressive array of Buzz, Squeak & Rattle (S&R) products, solutions and knowledge for detecting annoying noises in full vehicles, modules, components, and materials. The installed base of OEMs and their supply chain is worldwide spanning Asia, Australia, Europe, North America, Russia, South America, and South Africa. MB delivers S&R equipment, software, test processes, and engineering services through an international agent network.



Vertical-Pitch-Roll (VPR) Shaker Table
at Seat JIT Plant

DESCRIPTION OF SERVICES FORD AND MB COLLABORATE

Ford has developed a comprehensive S&R Prevention Process to stop annoying noises in Seats and Instrument Panels (IPs), defined in the document entitled "IP/SEAT S&R SHAKER PROCESS" authored by Juergen Smets of S&R Body Engineering, Ford of Europe, dated January 03, 2012.

The process includes Design Validation (DV) testing and Production Validation (PV) testing at the sub-system level on shaker tables as well as vehicle level testing at the proving grounds, End of Line (EOL) tracks, and four poster test rigs.



Microphone Measurements for OK/Not OK
at IP JIT Plant

MB has delivered over 70 Ford-approved Shaker Tables to Ford and Ford suppliers of IPs and Seats. Shaker testing at the sub-assembly level is required at the supplier JIT plants during the product development process and during serial production to:

- Support the S&R DV/PV and quality control process as soon as possible
- Evaluate large sample sizes to capture product and process variation
- Demonstrate continued conformance of the product and process
- Support noise source identification and root cause investigations
- Support development and validation of Interim Containment Actions (ICA) and Permanent Corrective Actions (PCA) before introduction into serial production
- Detect and contain S&R issues prior to vehicle assembly.

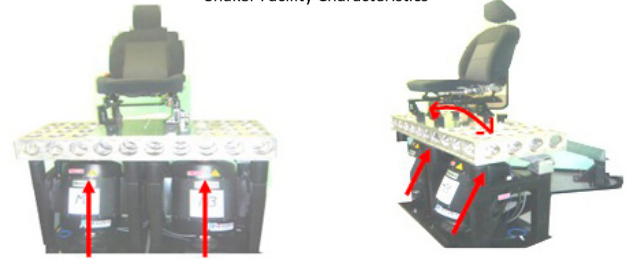
MB DYNAMICS ENGINEERING SERVICES

TO IMPLEMENT FORD-RECOMMENDED JIT PLANT S&R PROCESS USING SHAKER TABLES

- Facility design and qualification
 - Provide layout drawing for typical JIT Plant S&R facility
 - Review design of customer facility and quiet room
 - Perform testing to demonstrate acoustic requirements of quiet room are satisfied
- Assist with implementation of Ford Approved vibration profiles and test methods
 - Implementation of ICA/PCA
 - Linkage of issues identified on shaker table with issues identified in vehicle
- Provide training to perform S&R evaluations according to Ford's requirements
 - Dynamic evaluations using shaker table
 - Static evaluations (occupant loading and functioning)
 - Techniques for noise source identification
 - Subjective assessment of noises and Ford rating scales
- Assist with product S&R evaluations while on-site (Demonstrate effective methodology)
 - Identify noise source
 - Determine and verify root cause
 - Determine Significant Characteristics (SCs) to prevent S&R
 - Implement quality checks and firewall for known product issues
- Assist with setting up process for issue management and tracking
 - 8D process
 - Painter Charts for tracking issue and implementation of ICA/PCA
 - Linkage of issues identified on shaker table with issues identified in vehicle
- Provide coaching and training regarding Ford's vehicle level evaluation process
 - End of Line (EOL Testing)
 - Four Poster (aka Hydropuls) testing
 - Ford Consumer Product Audit (FCPA) and Voice of the Customer (VOC)



Shaker Facility Characteristics



Vertical, Fore-Aft and Pitch motions, controlled on Cross Car Beam in vertical direction; 2 ED shakers driven in-phase



Roll and Lateral motions, controlled at Cross Car Beam in lateral direction; 2 ED shakers (out-of-phase)

Pivot point at floor level to enable coupled motions

“ MB has considerable experience using these Shaker Tables in Ford and supplier facilities to support S&R DV/PV/CC testing, and MB has the know-how to assist Seat & IP suppliers to rapidly, systematically, and effectively implement the Ford S&R Prevention process. MB is uniquely qualified to provide these services as MB personnel have the requisite skills and experiences amassed over 20 years. ”

