

ACOUSTICS2008/2432

Virtual statistical energy analysis for vibroacoustic industrial prediction

G rard Borello^a, Laurent Gagliardini^b and Denis Thenail^b

^aInterAC, 10 impasse Borde-Basse, ZA. La Violette, 31240 L'Union, France

^bPSA Peugeot Citro en, Route de Gisy, 78943 V lizy-Villacoublay Cedex, France

In the mid-frequency range (200-2000 Hz), difficulty is encountered when modeling car body vibroacoustic interactions, mainly due to the complexity of automotive design. Analytical Statistical Energy Analysis (ASEA) is efficient to bring to the fore regions of interest regarding NVH design but was proven to be accurate only above 2000 Hz. To overcome ASEA limitations at lower frequencies, Virtual SEA (VSEA) technique was introduced to translate the dynamic information contained in a finite element (FE) model into an SEA model. Any FE model, whatever its complexity, can thus be processed thanks to an automatic sub-structuring algorithm and a built-in VSEA modal synthesis solver, fast leading to robust numerical SEA model. VSEA also addresses structure-borne noise problems by coupling structural VSEA subsystems to analytical acoustic subsystems through a virtual wave number. Investigation of damping and trim treatment effects on mixed acoustic and structural subsystems are thus possible. While reviewing VSEA theory, industrial application cases will be presented.