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## Combined Simulation Approach For Dry Clutch Systems

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In its global development process GM-Powertrain follows a consequent ?Road to Lab to Math? strategy, substituting road and laboratory tests with virtual tests. Hence simulation increasingly becomes a central aspect in the vehicle development process. With increasing accuracy of the single tools and a smart combination of different tools the credibility of the whole simulation chain comes closer to testing results. Furthermore the simulation gives us the possibility to change early and easily the product attributes in regard to functionality, robustness, comfort etc.. The enormous product cost resulting from a high amount of different test samples can be decreased by an early screening of the desired product functionality. Within GM-Powertrain a combined clutch simulation approach is used which joins the simulation tools Matlab/Simulink, LMS AMESim, Abaqus, Fortran, STAR-CCM+, NX Unigraphics to a powerful development process. A dry friction clutch is beside its main functionality, building the connecting link between engine and transmission, often the weakest link in the complete powercube (P3). The customer expectations on the clutch system are that it is comfortably operable over lifetime under consideration of all known cases of tolerances out of the serial production.

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