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## **LOOK-UP BASED SYNCHRONIZER LOGIC FOR THE EFFECTIVE ACTUATION OF THE COUNTERSHAFT BRAKE IN A HEAVY DUTY AMT WITH FACE DOG CLUTCH**

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**ABSTRACT** - This paper presents a flexible look-up based method for the actuation of an electro-pneumatic countershaft brake of a three-staged heavy duty Automated Mechanical Transmission to accomplish the synchronization of the unsynchronized main gearbox for upshifts at moving vehicle. The method utilizes look-up curves generated through numerical simulations made with a dynamical model of a face dog clutch – countershaft brake mechanical system. The operating principles are set up in a way to ensure that the conflicting requirements for gearshift comfort – in terms of gearshift time and vibrations – and for the prevention of permanent tooth-on-tooth situations are both fulfilled, and countershaft brake solenoid valve actuation number is also kept as low as possible. The developed synchronization method is implemented into a transmission control software, and evaluated with hardware-in-the-loop bench tests of a heavy duty AMT.