Dynamic of poly-V belts: power loss analysis

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Abstract

Over the last years, significant research effort has been directed towards developing vehicle transmissions more energy efficient. This effort has been a direct consequence of the new environmental regulations encouraging truck and car manufacturers to reduce the power losses of their engines. Thus, for development purposes and in belt transmission design it is worth predicting the potential power losses before manufacturing. To this aim, theoretical models have been developed taking into consideration different types of power loss in a Front Engine Accessory Drive. These losses have several origins: from the poly-V belt or from the mechanical components of the system (bearings, tensioners). In the first case, energy is dissipated inside the belt due to the hysteretic behavior of the belt constitutive elastomer. A part of this energy is dissipated inside the belt-spans when submitted to cyclic loading: tension fluctuations (belt vibrations) generated from the engine acyclism. This study is conducted to determine a power loss map of the system considering different transmission designs.

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