

1. Record Nr.	UNINA9910627256503321
Autore	Baumann Axel
Titolo	Minimizing of automotive transmission rattle noise by means of gear oils : lubrication for improved properties // Axel Baumann
Pubbl/distr/stampa	Cham, Switzerland : , : Springer, , [2022] ©2022
ISBN	9783658377083 9783658377076
Descrizione fisica	1 online resource (157 pages)
Disciplina	629.2872
Soggetti	Automobiles - Occupant restraint systems
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Includes index.
Nota di contenuto	Intro -- Abstract -- Contents -- Abbreviations and Indexes -- Symbols -- 1 Introduction -- 1.1 Issue -- 1.2 Task and Objective of the Work -- 1.3 Structure of the Work -- 2 State of the Art in Research and Technology -- 2.1 Market and Development Situation of Vehicle Transmissions -- 2.2 Torsional Vibration Behavior of Internal Combustion Engines -- 2.3 Requirements and Structure of Vehicle Transmissions in Spur Gear Design -- 2.4 Work on Rattling Noise Behavior of Vehicle Transmissions -- 2.5 Measures to Minimize Rattle Noise from Vehicle Transmissions -- 2.6 Transmission Power Loss -- 3 Gear Rattling Noises from Vehicle Transmissions -- 3.1 Gear Rattling -- 3.2 Synchronizer Ring Rattling -- 3.3 Rattle Noise Analysis of Vehicle Transmissions -- 3.3.1 Test Bench Setup and Test Execution -- 3.3.2 Acoustic Properties of the Soundproof Cabin -- 4 Lubricants as Design Elements -- 4.1 Tasks and Requirement Profile of a Gear Lubricant -- 4.2 Chemical Composition of Gear Oils -- 4.2.1 Mineral Oil Based Base Oils -- 4.2.2 Polyether Oils -- 4.2.3 Synthetic Hydrocarbons -- 4.2.4 Carboxylic Acid Esters -- 4.2.5 Additives -- 4.3 Mechanical Properties of Gear Oils -- 4.3.1 Viscosity -- 4.3.2 Density -- 4.4 Selected Test Procedures for Testing Gear Oils -- 4.4.1 Contact Angle Measurement -- 4.4.2 Mini Traction Machine for Measuring the Coefficient of Friction -- 4.4.3 Flow Behavior under Shear Stress -- 5 Parameter Variation of Base Oils and Additives -- 5.1 Structure

of the Manual Transmission for Front-Transverse Drive -- 5.2 Test Procedure -- 5.3 Rattle Noise Investigations -- 5.3.1 Standard Gear Oils, Adhesion Additive and Wetting Agent -- 5.3.2 Gear Oils Based on Polyalkylene Glycols -- 5.3.3 Base Oil Type Variation -- 5.3.4 Variation of VI Improvers -- 5.3.5 Different Concentrations of Dispersant PAMA -- 5.3.6 Various VI Improvers in High Concentration. 5.3.7 Formulations with Ester Oils -- 5.3.8 Effect of Friction Modifier and Antifoam Agent -- 5.4 Measurement of the Drive-Side Torque Loss -- 5.5 Notes on formulating an optimized gear oil -- 6 Correlation between Oil and Geometric Parameters -- 6.1 Structure of the Single-Stage Test Gearbox -- 6.2 Test Procedure -- 6.3 Gear Rattle Experiments -- 6.3.1 Oil Level Variation -- 6.3.2 Variation of the Oil Sump Temperature -- 6.3.3 Contribution of Synchronizers -- 6.3.4 Influence of a Relative Speed Between Gear Shaft and Idler Gear -- 6.3.5 Influence of the Oil Type with Different Torsional Backlashes -- 6.3.6 Dependence between Axial and Torsional Backlash -- 6.4 Synchronizer Ring Rattling Experiments -- 6.4.1 Variation of Oil Sump Temperature -- 6.4.2 Influence of a Relative Speed between the Synchronizer Hub and Synchronizer Ring -- 6.4.3 Variation of the Clearance between Synchronizer Hub and Synchro-Ring -- 7 Mechanism of Gear Rattling Noise Generation -- 7.1 Rotational Path Deviation Without Torsional Vibration Excitation -- 7.2 Comparison of Straight and Helical Gears -- 7.3 Influence of Torsional Backlash with Helical Idler Gear in the Non-Shifted State -- 7.4 Variation of the Oil Type with Helical Gearing -- 7.5 Summary of the Mechanism of Rattling Noise Generation -- 8 Summary and Outlook -- Bibliography.
