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Spur and Bevel Gearing **Gear Design Simplified** Spur Gears *American Standard Spur Gear Tooth Form ... ...* *On the Geometry of External Involute Spur Gears* Tooth Proportions for Coarse-pitch Involute Spur Gears *Spur Gear Tooth Form* **Bending Strength Model for Internal Spur Gear Teeth** Systematic Analysis of Gear Failures **Effect of Extended Tooth Contact on the Modeling of Spur Gear Transmissions** *The Geometry of Involute Gears* Influence of Tooth Profile Modification on Spur Gear Dynamic Tooth Strain **Computer Simulation of Gear Tooth Manufacturing Processes** *Gear Handbook* Involute Spur Gears **Spur-gear-system Efficiency at Part and Full Load** **Spur and Bevel Gearing** *SPUR & BEVEL GEARING* *Notes on Straight Spur Gears* **Spur Gearing** Manual of Gear Design ...: Helical and spiral gears **Experimental Measurement of Deflections and Strains in a Spur Gear Tooth** **Tentative American Standard Spur Gear Tooth Form 14 1/2 Degree Composite System 20 Degree Stub Involute System** **An Improved Computer Program for Stress Analysis of Spur Gear Tooth** **Photoelastic Study of Stresses in Spur Gear Teeth** **Determination of Bending Stresses in a Spur Gear Tooth** *The Dynamic Loading of Spur Gear Teeth* **Experimental Determination of Spur Gear Tooth Deflection and Load Distribution and a Comparison with Predictions** The Element Stress Analysis of a Generic Spur Gear Tooth *Procedure for Tooth Contact Analysis of a Face Gear Meshing with a Spur Gear Using Finite Element Analysis* *Analysis of Load Sharing in Spur Gear Teeth* **The Internal Gear, Design and Application** **Dynamic Loading of Spur Gears with Linear Or Parabolic Tooth Profile Modifications** Dynamic Loading of Spur Gear Teeth The Internal Gear, Design and Application **Contact Stresses in Meshing Spur Gear Teeth** *Load-carrying capacity of spur gear teeth hob cut from molded du pont "ZYTEL" 101* Standard 14.5 Inch Spur Gear Teeth Involute Spur Gears Dudley's Handbook of Practical Gear Design and Manufacture, Second Edition

This work has been selected by scholars as being culturally important, and is part of the knowledge base of civilization as we know it. This work was reproduced from the original artifact, and remains as true to the original work as possible. Therefore, you will see the original copyright references, library stamps (as most of these works have been housed in our most important libraries around the world), and other notations in the work. This work is in the public domain in the United States of America, and possibly other nations. Within the United States, you may freely copy and distribute this work, as no entity (individual or corporate) has a copyright on the body of the work. As a reproduction of a historical artifact, this work may contain missing or blurred pages, poor pictures, errant marks, etc. Scholars believe, and we concur, that this work is important enough to be preserved, reproduced, and made generally available to the public. We appreciate your support of the preservation process, and thank you for being an important part of keeping this knowledge alive and relevant. A unique, single source reference for all aspects of gears, Dudley's Handbook of Practical Gear Design and Manufacture, Second Edition provides comprehensive and consistent information on the design and manufacture of gears for the expert and novice alike. The second edition of this industry standard boasts seven new chapters and appendices as well as a wealth of updates throughout. New chapters and expanded topics include: Gear Types and Nomenclature, Gear Tooth Design, Gear Reactions and Mountings, Gear Vibration, The Evolution of the Gear Art, Novikov Gearing and the Inadequacy of the Term, and thoroughly referenced Numerical Data Tables. Features: Offers a single-source reference for all aspects of the gear industry Presents a comprehensive and self-consistent collection of knowledge, practical methods, and numerical tables Discusses optimal design and manufacture of gears of all known designs for the needs of all industries Explains concepts in accessible language and with a logical organization, making it simple to use even by beginners in the field Provides adequate recommendations for gear practitioners in all areas of gear design, production, inspection, and application Includes practical examples of successful use of tools covered in the Handbook Logically organized and easily understood, the Handbook requires only a limited knowledge of mathematics for adequate application to almost any situation or question. Whether you are a high-volume gear manufacturer or a relatively small factory, the Handbook and some basic common sense can direct the sophisticated design of any type of gear, from the selection of appropriate material, production of gear blanks, cutting gear teeth, advanced methods of heat treatment, and gear inspection. No other sources of information are necessary for the gear designer or manufacturer once they have the Handbook. A procedure was developed to perform tooth contact analysis between a face gear meshing with a spur pinion using finite element analysis. The face gear surface points from a previous analysis were used to create a connected tooth solid model without gaps or overlaps. The face gear surface points were used to create a five tooth face gear Patran model (with rim) using Patran PCL commands. These commands were saved in a series of session files suitable for Patran input. A four tooth spur gear that meshes with the face gear was designed and constructed with Patran PCL commands. These commands were also saved in a session files suitable for Patran input. The orientation of the spur gear required for meshing with the face gear was determined. The required rotations and translations are described and built into the session file for the spur gear. The Abaqus commands for three-dimensional meshing were determined and verified for a simplified model containing one spur tooth and one face gear tooth. The boundary conditions, loads, and weak spring constraints were determined to make the simplified model work. The load steps and load increments to establish contact and obtain a realistic load was determined for the simplified two tooth model. Contact patterns give some insight into required mesh density. Building the two gears in two different local coordinate systems and rotating the local coordinate systems was verified as an easy way to roll the gearset through mesh. Due to limitation of swap space, disk space and time constraints of the summer period, the larger model was not completed.Bibel, George and Lewicki, David G. (Technical Monitor)Glenn Research CenterROTATION; GEAR TEETH; BOUNDARY CONDITIONS; FINITE ELEMENT METHOD; TIME; COMPUTER PROGRAMS; LOADS (FORCES) Explores the detailed steps necessary to determine the causes of failure. First, the physical characteristics of a gear are studied: where the stress points are, from what directions the forces are applied, where the movement of material progresses, and where strain patterns exist. Second, all external conditions and forces are considered. With this background information, a systematic examination is described from beginning to end, the end being a conclusion about the mode and cause of failure. Overview This classic reference is a compilation of a series of gear-designing charts illustrating by simple diagrams and examples the solutions of practical problems relating to spur gears, straight-tooth bevel gears, spiral-bevel gears, helical gears for parallel shaft drives, helical (spiral) gears for angular drives, herringbone gears, and worm gears. Contact stresses in meshing spur gear teeth are examined. The analysis is based upon an incremental finite element procedure that simultaneously determines the stresses in the contact region between the meshing teeth. The teeth themselves are modeled by two dimensional plain strain elements. Friction effects are included, with the friction forces assumed to obey Coulomb's law. The analysis assumes that the displacements are small and that the tooth materials are linearly elastic. The analysis procedure is validated by comparing its results with those for the classical two contacting semicylinders obtained from the Hertz method. Agreement is excellent. Hsieh, Chih-Ming and Huston, Ronald L. and Oswald, Fred B. Glenn Research Center NSG-3188; DA PROJ. 1L1-62211-A-47A... A volume in the Mechanical Engineering Series, this text examines the involute spur gear, its properties, design, and strength. This work has been selected by scholars as being culturally important, and is part of the knowledge base of civilization as we know it. This work was reproduced from the original artifact, and remains as true to the original work as possible. Therefore, you will see the original copyright references, library stamps (as most of these works have been housed in our most important libraries around the world), and other notations in the work. This work is in the public domain in the United States of America, and possibly other nations. Within the United States, you may freely copy and distribute this work, as no entity (individual or corporate) has a copyright on the body of the work. As a reproduction of a historical artifact, this work may contain missing or blurred pages, poor pictures, errant marks, etc. Scholars believe, and we concur, that this work is important enough to be preserved, reproduced, and made generally available to the public. We appreciate your support of the preservation process, and thank you for being an important part of keeping this knowledge alive and relevant. Internal spur gear teeth are normally stronger than pinion teeth of the same pitch and face width since external teeth are smaller at the base. However, ring gears which are narrower, have an unequal addendum or are made of a material with a lower strength than that of the meshing pinion may be loaded more critically in bending. In this study, a model for the bending strength of an internal gear tooth as a function of the applied load pressure angle is presented which is based on the inscribed Lewis constant strength parabolic beam. The bending model includes a stress concentration factor and an axial compression term which are extensions or the model for an external gear tooth. The geometry of the Lewis factor determination is presented, the iteration to determine the factor is described and the bending strength J factor is compared to that of an external gear tooth. This strength model will assist optimal design efforts for unequal addendum gears and gears of mixed materials. (AN). A computer simulation was conducted to investigate the effects of both linear and parabolic tooth profile modification on the dynamic response of low-contact-ratio spur gears. The effect of the total amount of modification and the length of the modification zone were studied at various loads and speeds to find the optimal profile modification for minimal dynamic loading. Design charts consisting of normalized maximum dynamic load curves were generated for gear systems operated at various loads and with different tooth profile modification. An optimum profile modification can be determined from these design charts to minimize the dynamic loads of spur gear systems. Keywords: Spur gears, Gear teeth, Gear noise, Gearboxes, Dynamic load, Profile modification, Transmission error, Gear design. (SDW). Of all the many types of machine elements which exist today, gears are among the most commonly used. The basic idea of a wheel with teeth is extremely simple, and dates back several thousand years. It is obvious to any observer that one gear drives another by means of the meshing teeth, and to the person who has never studied gears, it might seem that no further explanation is required. It may therefore come as a surprise to discover the large quantity of geometric theory that exists on the subject of gears, and to find that there is probably no branch of mechanical engineering where theory and practice are more closely linked. Enormous improvements have been made in the performance of gears during the last two hundred years or so, and this has been due principally to the careful attention given to the shape of the teeth. The theoretical shape of the tooth profile used in most modern gears is an involute. When precision gears are cut by modern gear-cutting machines, the accuracy with which the actual teeth conform to their theoretical shape is quite remarkable, and far exceeds the accuracy which is attained in the manufacture of most other types of machine elements. The first part of this book deals with spur gears, which are gears with teeth that are parallel to the gear axis. The second part describes helical gears, whose teeth form helices about the gear axis. This paper presents results of dynamic strain gage measurements performed on the NASA gear-noise rig. The experiments were part of a joint research program between NASA and the U.S. Army Research Laboratory to advance the technology of rotorcraft transmissions. Tests were performed on six sets of low contact ratio spur gears with different tooth profile modifications. Results presented include static and dynamic measurements of gear tooth strain taken over a matrix of operating conditions. The results demonstrate that a well-designed tooth profile modification can significantly reduce dynamic loads in spur gears, especially for gears which operate at high speed and under high torque. The two parabolic modifications tested were not as effective as linear modifications, possibly because the modification zone was too long. (MM).