

Dynamic vibration absorber for shaft machining

*Oleg Drachev**, Igor Turbin, Irina Amirdzhanova, Tatyana Varentsova, and Veronika Petrova

Togliatti State University, Togliatti, Russian Federation

Abstract. The article is concerned with a new method that minimizes the vibration level of non-rigid axisymmetric parts on lathes. A schematic diagram of the vibration absorber control path is given. Its configuration is changing due to fictitious elastic stiffness parameters, as well as damping and the part-support subsystem weight. A functional dual circuit diagram of an automatic vibration level control system for non-rigid shafts machining is presented and its working principle is described

Cutting process is the main source of forced vibrations in the operation of metal-cutting machines. It is possible to minimize vibration during cutting in various ways. These are relatively simple process techniques and special vibration absorbers. Vibrations can also be reduced by increasing the rigidity of the TOS (machining process system), using tools with improved geometry, optimizing cutting modes, and using dynamic vibration absorbers. The disadvantage of a dynamic vibration absorber is that it operates only at a certain frequency that corresponds to its resonant mode. Linear dynamic vibration absorbers that restore the elastic suspension forces are effective only in the case of strictly fixed excitation frequencies of rigid parts of the shaft type, and therefore their use is limited [2, 3, 4]. Even minor changes in the frequency of vibration sharply reduce the effectiveness of its operation, since it is removed from the resonant mode. Linear dynamic vibration absorbers that restore the elastic suspension forces are effective only in the case of strictly fixed excitation frequencies of rigid parts of the shaft type, and therefore their use is limited [6]. It is advisable to use such vibration absorbers in systems that have a time-constant vibration spectrum. Vibration absorbers equipped with automatic control systems are the most efficient in terms of minimizing the level of vibrations [1, 5]. The use of nonlinear elastic elements in dynamic absorbers slightly expands the scope of their application. If the parameters of the absorber are selected properly it allows preventing the unacceptable resonant vibrations in the process of shafts machining in a wider range of excitation frequencies. However, when the excitation frequency changes over a wider range (for example, in transient modes), nonlinear dynamic vibration dampers also turn out to be ineffective, and in these cases, it is advisable to design controlled vibration absorbers with automatic frequency adjustment [5]. Changing fictitious parameters method is proposed of the part-support system using a feedback loop to ensure minimization during cutting. The schematic diagram of the system under consideration is shown in Fig. 1.

* E-mail:doi05@mail.ru

Shaft Vibration Absorber

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Dynamic Vibration Absorbers Boris G. Korenev, Boris Grigor'evich Korenev, Leonid M. Reznikov, 1993-11-02 A detailed and extensive description regarding the theory of passive dynamic absorbers not requiring additional energy sources Considers the peculiarities in solving vibration absorption problems using the simplest double mass linear model of the protected structure and absorber Examines design schemes and offers data on the efficiency of complicated absorber models Deals with the problems of vibration damping of continuous and multimass systems Describes practical applications of the vibration protection theory for various constructions and objects Mechanical Vibrations, 2nd Edition Mehta J.S. and Kailey A.S.,

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Tschöke, 2010-06-22 This machine is destined to completely revolutionize cylinder diesel engine up through large low speed t engine engineering and replace everything that exists stroke diesel engines An appendix lists the most From Rudolf Diesel s letter of October 2 1892 to the important standards and regulations for diesel engines publisher Julius Springer Further development of diesel engines as economiz Although Diesel s stated goal has never been fully ing clean powerful and convenient drives for road and achievable of course the diesel engine indeed revolu nonroad use has proceeded quite dynamically in the tionized drive systems This handbook documents the last twenty years in particular In light of limited oil current state of diesel engine engineering and technol reserves and the discussion of predicted climate ogy The impetus to publish a Handbook of Diesel change development work continues to concentrate Engines grew out of ruminations on Rudolf Diesel s on reducing fuel consumption and utilizing alternative transformation of his idea for a rational heat engine fuels while keeping exhaust as clean as possible as well into reality more than 100 years ago Once the patent as further increasing diesel engine power density and was filed in 1892 and work on his engine commenced enhancing operating performance

Mechanical Vibrations J. P. Den Hartog, 2011-03-23 This book grew from a course of lectures given to students in the

Design School of the Westinghouse Company in Pittsburgh Pa in the period from 1926 to 1932 when the subject had not yet been introduced into the curriculum of our technical schools From 1932 until the beginning of the war it became a regular course at the Harvard Engineering School and the book was written for the purpose of facilitating that course being first published in 1934 In its first edition it was influenced entirely by the author s industrial experience at Westinghouse the later editions have brought modifications and additions suggested by actual problems published in the literature by private consulting practice and by service during the war in the Bureau of Ships of the U S Navy The book aims to be as simple as is compatible with a reasonably complete treatment of the subject Mathematics has not been avoided but in all cases the mathematical approach used is the simplest one available In the third edition the number of problems has again been increased while the principal changes in the text concern subjects in which recent advances have been made such as airplane wing flutter helicopter ground vibration torsional pendulum dampers singing ships propellers and electronic instruments

Research Series ,1928 Official Gazette of the United States Patent Office United States. Patent Office,1971

Frontier Computing Jason C. Hung,Neil Y. Yen,Jia-Wei Chang,2020-02-25 This book gathers the proceedings of the 9th International Conference on Frontier Computing held in Kyushu Japan on July 9 12 2019 and provides comprehensive coverage of the latest advances and trends in information technology science and engineering It addresses a number of broad themes including communication networks business intelligence and knowledge management web intelligence and related fields that inspire the development of information technology The respective contributions cover a wide range of topics database and data mining networking and communications web and internet of things embedded systems soft computing social network analysis security and privacy optical communication and ubiquitous pervasive computing Many of the papers outline promising future research directions and the book will benefit students researchers and professionals alike Further it offers a useful reference guide for newcomers to the field *Principles of Automotive Vehicles* United States. Department of the Army,1956 **Technical Manual** United States Department of the Army,1956

Magnetorheological Fluid Technology Seung-Bok Choi,Young-Min Han,2012-11-08 Magnetorheological Fluid Technology Applications in Vehicle Systems compiles the authors recent work involving the application of magnetorheological MR fluids and other smart materials in vehicles It collects concepts that have previously been scattered in peer reviewed international journals After introducing the physical phenomena and prope **Scientific Canadian Mechanics' Magazine and Patent Office Record** Canada. Patent Office,1928 **The Canadian Patent Office Record and Register of Copyrights and Trade Marks** ,1928 **Aviation Unit and Intermediate Maintenance for Army UH-60A and EH-60A Helicopters** ,1991 Resonant Robotic Systems V. I. Babitsky,Alexander Shipilov,2012-09-22 Especially designed as self sustaining oscillating systems resonant robotic systems use the natural modes of oscillation of electromechanical modules for their movements In fact manipulator systems built on these principles demonstrate record breaking characteristics in performance

The authors summarize the results and experience of research on and development of resonant robotic systems For the readers convenience a presentation of design concepts is followed by solutions to new dynamical and control problems The book is intended for designers researchers and graduate students *Aviation Unit and Intermediate Maintenance Manual* ,1991 Vibration Problems in Engineering Stephen Timoshenko,1928 The Journal of the Society of Automotive Engineers ,1920 **Journal of the Society of Automotive Engineers** ,1925 Vols 30 54 1932 46 issued in 2 separately paged sections General editorial section and a Transactions section Beginning in 1947 the Transactions section is continued as SAE quarterly transactions **Automotive Engineering** ,1920

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