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The Collection of Mechanisms within the Digital Mechanism and Gear Library (DMG-Lib) – A Knowledge Base for Engineers, Scientists and Students

Mechanical motion devices are reliable and fundamental parts of modern technical products. During the period of industrialisation mechanism science was systematized and established as an important discipline in the domain of general machine science by contemporary engineers like Reuleaux, Watt and Evans. The principles of mechanical motion and kinematics were developed and documented in textual form and also in a very demonstrative form of fully functional kinematic models. Modern designs still using advancements of those basic mechanisms which are known since industrial revolution. But the global knowledge about mechanisms in theory and application is mostly scattered and only fragmentarily accessible for users like engineers, scientists or students and it does not comply with today's requirements concerning a quick information retrieval.

The Digital Mechanism and Gear Library (DMG-Lib) can help to resolve this problem and will avoid the sneaking loss of knowledge in this field. In the DMG-Lib heterogeneous sources, which represent a big part of the knowledge about mechanisms, are collected, preserved and provided over an Internet portal (www.dmg-lib.org). The interdisciplinary DMG-Lib workgroup is lined up by staff from the Technical University of Ilmenau, the RWTH Aachen University and the Technical University of Dresden. The DMG-Lib project is supported by the German Research Foundation (DFG).

The variety of the relevant heterogeneous content sources of the DMG-Lib ranges from technical books, journal articles, research reports, mechanism catalogues, technical drawings over physical demonstration models, pictures, movies, interactive animations to software tools. A lot of these sources contain representations of mechanism structures in form of technical drawings, solution principles or images. These mechanism structures, extracted from scanned or digital sources or taken as image sequences from physical models, form together with mechanism-specific metadata so-called mechanism descriptions inside the DMG-Lib.

Enhanced with additional sources such as interactive animations, videos, pictures or hyperlinks to pages in literature, the collection of these mechanism descriptions provides in combination with mechanism-specific search functions a powerful via Internet accessible knowledge base for design solutions in the field of mechanical motion systems.

The interactive animations or the videos provide a visual impression of the certain motion-characteristic; additional literature offers more background information about engineering methods like analysis and synthesis techniques for example. In this way an engineer for instance can find possible solutions for his unique motion task; students at universities get a better understanding of motion systems and have an easy access to rare literature and to a lot of other helpful content.

This paper focuses on the collection of mechanism descriptions within the DMG-Lib, the custom workflow for the creation of these descriptions, beginning with discovering or locating of relevant content sources over further processing steps such as digitalization, quality improvement or finding descriptive metadata for mechanisms. With a typical motion task the specific search functions and the presentation of the search results inside the DMG-Lib Internet portal are also presented.

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