

Michael Kaiser, Dresden

Multi-media educational techniques at the TU Dresden

As part of the project „Multi-media teaching and educational environment in machinery“ modules for solving practical problems were constructed for engineers from research and development, those interested in business, and for mechanical engineering students

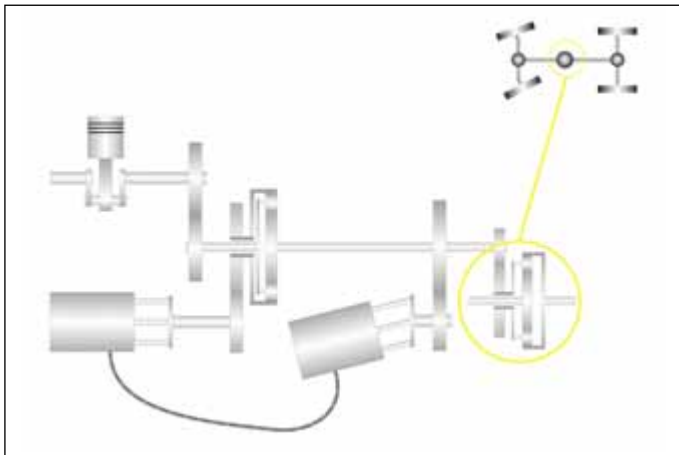


Fig. 1: Combustion engine – shifting gear

Main aim of this project is the bundling of previous activities and the establishment of a faculty-wide platform for presentation and administration of teaching and learning modules, but also for research results and education opportunities. For this, an Internet-based system is to be developed in the next few years. In the first phase, supported by the Saxony Ministry of Economics and Labour and the TU Dresden, the aim is the distribution of practically oriented research results to Saxon businesses. So far, ten institutes and organisations within engineering faculties are involved in the processing of the offerings involved with a module for the project having been calculated based on an actual research plan. The project is supported by the Media Design Center and Calculation Center, TU Dresden.

Project users

The users of the system can be students and staff from the specialist colleges and also businesses. The service offered is especially suitable for mid-sized companies producing capital investment products, for engineering offices and service industries in the mechanical engineering sector as well as for larger handwork companies. Those offering the information, Institutes and University Chairs make available over the system subject-specific information teaching material and services. An important aspect of the system lies in the rapid and modern publication and marketing of practical-oriented research results and the successive development of a future-oriented integrated workplace for study and further education.

Within this we see the following potentials of working together with businesses:

- Independent advice
- Provision of up-to-date and practically-relevant results

- Guiding of projects encouraging further development

• Exploitation on non-secret research results
The second important aspect lies in the exploitation of the chances for education of students for external students and for interested personnel in business with the aims of:

- Improved quality of training (multimedia application)
- Increasing practical applications (supplier catalogues, standards)
- Increased possibilities for direct and external study, training and further education
- Providing up-to-date information for training tasks and examples (demonstration solutions, programmes)

• A communication platform for students and higher education teachers/counsellors.
The processed modules for further education outwith the normal direct and external study can be exploited through the TUDIAS GmbH (TU Dresden Institute of Advanced Studies) founded by the TU Dresden which works together for this reason with the Engineering Faculty. These are the modules Student Working Place and Interactive Education Environment. For the project start innovative research projects will be selected which, based on the project conception have proved themselves well suited for the preparation and are relevant to a wide circle of users.

Project module „Drive systems for mobile working machinery“

The Chair of Agricultural Machinery is involved in the project with the module „Drive systems for mobile working machinery“.

The harvesting and, in-part, the preparation and processing of resultant products from plant production enterprises in agriculture is occurring in-field through using mobile working machinery. According to the product and its desired preparation there is already a series of technical solutions such as the combine harvester. With the investigation of preparation and processing systems for harvested products with the aim of applying them on mobile working machines there existed, and still exists, at the Chair of Agricultural Machinery new constructive

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and ambitious solutions such as for in-field potato starch substrate production.

Our module is developed from these aims. Most procedures in agriculture aimed at material production and processing are based on mechanical principles – the mobile working machine and the working implements must be driven. A greater importance, therefore, is attributed to the total drive technology of this machine.

Depending on complexity, the most different drives are applied, working according to thermodynamic, hydraulic, pneumatic, electric or combined principles.

For this reason primary importance is given to the layout of the drive structure for the working machine with an eye to sensible energy application (*fig. 1*).

Mobile working machinery is also used in own-industry areas. Similarities, especially for the drive train, exist with applications in transport, construction, conveying technology and communal machinery.

Following the distribution of this information which is the basis for solutional concepts technical solutions, diagram presentations on the function and application areas in pictures and overviews are presented.

Based on the function principles, the drive possibilities for working machines are presented as pictures.

Two ways are followed in the conception of a new drive: comparison of variants and calculation (*fig. 2*).

Fig. 2: Basics for calculation

Variant comparison: Following the presentation of evaluation criteria, weighting factors are determined on the basis of REFA working material.

After determining the usage value of the individual variants, the preferred variants are calculated, having then highest usage value.

After the establishment of performance parameters and specific characteristics which have to be shown by the drive selected, the technical data for the desired drive is produced via program-internal calculations as well as information for its application and, where required, ante and post activated aggregates.

The above drive types are included in the module calculation basis, included are phy-

sical fundamental facts regarding function, construction types are presented, relevant DIN regulations shown, and formula collections included.

All modules can be continuously extended or new modules can be added.

The development of a module is based on construction systematics as represented in the teaching of TU Dresden. This means that from the beginning a logically structured way of working is laid out indispensable for every constructive and scientific work.

The module „Drive systems for mobile working machines“ is continually updated by us. Information for those interested is available under <http://mlu.mw.tu-dresden.de>