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The Usage of TRIZ to improve material efficiency and energy efficiency of industrial production processes - Ideas for a conceptual framework

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Abstract

Cleaner Production is an organized approach to minimize industrial waste and emissions by increasing the efficiency of the use of materials and energy. It is propagated especially by UNIDO and UNEP as an approach to identify preventive measures, such as good housekeeping, technological changes, change of raw materials, internal and external recycling as a preventive approach to environmental protection by cutting on waste and emissions from industrial activities. Case studies conducted by the authors in the last 10 years demonstrate, that in a number of cases water consumption of industries from the surface treatment sector as well as from food processing could be reduced by 30 to 90%, auxiliary materials consumption could be reduced by 30 to 50%, and energy consumption of processes could be reduced by 15 to 25%. All these measures were actually economically beneficial for the companies, most of these measures paid back in less than one year.

Although Cleaner Production has been around for more than 15 years, until now only encyclopedic checklists are available to assist in the identification of improvement options. Still focused expert knowledge is necessary to locate the potential areas for improvement.

TRIZ offers very strong tools for process improvement. The authors have found from their projects and research, that especially the concept of the Ideal Final Result, and the Laws of Evolution form a conceptual framework which can aid effectively in the identification of improvement options in a systematic way. The approach used will be demonstrated in the presentation and the full paper along with examples from different sectors.

Keywords:
cleaner production, material efficiency, waste minimisation, zero emission, energy efficiency, ideal final result, laws of evolution

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