

The MODAPTS method redesigns workplaces with the aim of safer, better and easier work. Finding new solutions such as the reduction of manual labour through the elimination of idle motions as well as harmful and cyclical movements of the body provides a breakthrough in improving working conditions, labour efficiency and product quality, which ultimately contributes to the satisfaction of workers and employers.

Situation analysis and improvement of the process of creeling cross-wound bobbins will reduce the risk of injuries caused by muscular stresses and efforts which are present in this phase because of much manual work and numerous different movements. The improvements achieved will increase productivity and work quality will rise and operator sick leave will be reduced.

## Acknowledgement

The results shown in the paper resulted from the scientific program (Advanced Technical Textiles and Processes, code: 117-0000000-137) conducted with the support of the Ministry of Science, Education and Sports of the Republic of Croatia.

## References

1. International MODAPTS Association, Inc. Kalamazoo, MI: MODAPTS <http://www.modapts.org/bylaws.htm>, 25.05.2012.
2. Brnada S, Šabarić I, Kovačević S. Application of Modapts Method in the Warping Process. In: *4th International Conference, ERGONOMICS 2010*, Stubice Toplice, Croatia, 30 June - 03 July 2010, pp. 143-150.
3. Karger Delmar W, Franklin Bayha H. *Engineereng Work Measurement*. Industrial press Inc., New York, 1987.
4. Hirano H. 4S for Operators - 5 Pillars of the Visual Workplace, Productivity Press, Portland, Oregon, 1996.
5. Kobayashi I. *Material, Notes and Papers*. PPORF Development Institute, Japan, 1996.
6. Kovačević S, Penava Ž, Oljača M. Optimisation of Production Costs and Fabric Quality. *Fibres & Textiles in Eastern Europe* 2006; 14, 2: 40-48.
7. Kovačević S, Orešković V. Time Analysis in the Preparatory Operations of Warp and Weaving. *Fibres & Textiles in Eastern Europe* 1999; 7, 4: 50-53.
8. Kovačević S. Analysis of Operator's Work on Conventional and Modern Machines in Mechanical Processing of textiles. *Tekstil* 2001; 50, 7: 245-250.

Received 06.08.2012 Reviewed 20.11.2012



# INSTITUTE OF BIOPOLYMERS AND CHEMICAL FIBRES

## LABORATORY OF ENVIRONMENTAL PROTECTION

The Laboratory works and specialises in three fundamental fields:

- **R&D activities:**
  - research works on new technology and techniques, particularly environmental protection;
  - evaluation and improvement of technology used in domestic mills;
  - development of new research and analytical methods;
- **research services** (measurements and analytical tests) in the field of environmental protection, especially monitoring the emission of pollutants;
- **seminar and training activity** concerning methods of instrumental analysis, especially the analysis of water and wastewater, chemicals used in paper production, and environmental protection in the paper-making industry.

Since 2004 Laboratory has had the accreditation of the Polish Centre for Accreditation No. AB 551, confirming that the Laboratory meets the requirements of Standard PN-EN ISO/IEC 17025:2005.



AB 388

Investigations in the field of environmental protection technology:

- Research and development of waste water treatment technology, the treatment technology and abatement of gaseous emissions, and the utilisation and reuse of solid waste,
- Monitoring the technological progress of environmentally friendly technology in paper-making and the best available techniques (BAT),
- Working out and adapting analytical methods for testing the content of pollutants and trace concentrations of toxic compounds in waste water, gaseous emissions, solid waste and products of the paper-making industry,
- Monitoring ecological legislation at a domestic and world level, particularly in the European Union.

A list of the analyses most frequently carried out:

- Global water & waste water pollution factors: COD, BOD, TOC, suspended solid (TSS), tot-N, tot-P
- Halogenoorganic compounds (AOX, TOX, TX, EOX, POX)
- Organic sulphur compounds (AOS, TS)
- Resin and chlororesin acids
- Saturated and unsaturated fatty acids
- Phenol and phenolic compounds (guaiacols, catechols, vanillin, veratrols)
- Tetrachlorophenol, Pentachlorophenol (PCP)
- Hexachlorocyclohexane (lindane)
- Aromatic and polyaromatic hydrocarbons
- Benzene, Hexachlorobenzene
- Phthalates
- Carbohydrates
- Glycols
- Polychloro-Biphenyls (PCB)
- Glyoxal
- Tin organic compounds

### Contact:

INSTITUTE OF BIOPOLYMERS AND CHEMICAL FIBRES  
ul. M. Skłodowskiej-Curie 19/27, 90-570 Łódź, Poland  
Małgorzata Michniewicz Ph. D.,  
tel. (+48 42) 638 03 31, e-mail: [michniewicz@ibwch.lodz.pl](mailto:michniewicz@ibwch.lodz.pl)