Association for Machines and Mechanisms News Bulletin

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Our Objectives and Activities

The main objective of AMM is to contribute to mechanical design at all levels starting from academic research to industrial initiatives, thereby enhancing the quality and reliability of indigenous machines. With this in view, AMM organises the National Conference on Machines and Mechanisms, NaCoMM, and the workshops on Industrial Problems on Machines and Mechanisms, IPRoMM.

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Message from the Editor-in-Chief

Improvement of tools and implements used by rural people using modern scientific methods

Devices, equipments, machines used by the artisans of India in different rural industries, e.g., carpet, wool, and many others are very old. As an example, loom and hand tools used by the artisans of hand-knotted carpets are very old. The designs of such devices may not have changed in centuries or so, even though there are health hazards for the artisans, e.g., bruises in the hands while using some of the hand tools, and the productivity is poor. On the other hand, there is a phenomenal growth in the design and manufacturing of, say, components produced by auto, machine tools, telecom, and other industries. Some of the latter industries are at par with the international products, as more and more international companies are starting their design and production centres in India. Moreover, the academic and research institutes in engineering also focus more on the latter products due to their acquaintances to the general public. Anything rural is considered not challenging as they are not much talked about by the people. Such apathy can be attributed to

1. The problems faced by the rural industries are very local in nature due to their geographical locations, local habits, etc. Hence, the engineering community who is generally interested in problems of generic nature does not pay much attention to these rural issues.
2. Lack of awareness by the rural industrial people about whom to approach when faced by such problems. Hence, the problems go unreported.
3. Lack on interest by the engineering community to take up such problems due to non-availability of easy literature on those topics unlike the vast literature available on the popular so called talked about systems like automobiles, consumer products like TV, VCR, etc., machine tools, and others.

Therefore it is required to initiate a research in Rural Engineering Problems to improve the design of rural systems. It is also needed to popularise such activities amongst the researchers and students to take up such problems as their research or project topics, respectively, and at the same time make the user groups aware of such solutions. These activities are expected to solve many rural engineering problems in the long run, and help the rural industries to improve their quality, productivity, and efficiency. Association for Machines and Mechanisms can popularise such activities through its conferences, workshops, symposia and seminars amongst academia, researchers and students to think in this direction.

In this issue a textile column and a column on recently published book are included. An article on “Measurement of Internal Pressure Exerted by Medical Bandages” is given under the Textile Column.

Himanshu Chaudhary, Editor-in-Chief

Measurement of Internal Pressure Exerted by Medical Bandages[#]

This article reports the design and development of a computerised instrument for online measurement of the internal pressure exerted by medical bandages over a period of time. The article briefly explains the effects of variables, namely fabric construction, hardness of surface below the bandage (i.e. to simulate the wide range of human physical structures), bandage width, style of wrapping i.e. the overlap and the direction of wrapping (from knee towards ankle or vice versa) have been studied by using a prototype designed and developed based on pneumatic principle. The objectives in the development were to explore the impact of bandage structure, hardness of the surface of the body over which the bandage is being applied, width of bandages, direction of wrapping and extent of overlapping on internal pressure profile of bandage. Experiments have been conducted using an indigenously designed and developed computerised instrument based on pneumatic principle to investigate the effects of various parameters on the pressure profile of the bandages.

The principle employed relates to the pressure changes in the fluid on application of an external pressure. An air bladder was made and wrapped around the wooden mannequin leg, which was then inflated with air at a particular pressure to simulate the human body softness, and then the bandage was wrapped over the mannequin leg containing the bladders (Fig. 1). The medical bandages were tested for obtaining the pressure exerted vs. time profiles for the two different regions (i.e. ankle and below the knee) tested. Three different bandages were used in this study. The study was done by wrapping the bandage around the leg, containing the air bladders filled with particular pressures, and then recording the online internal pressure over a particular period through differential pressure sensor, digital process controller, analog-to-digital card and computer (Fig. 2).

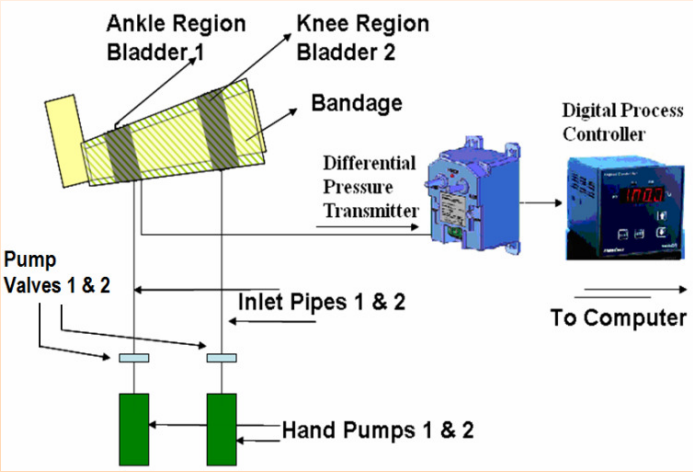


Fig. 1. Schematic of prototype

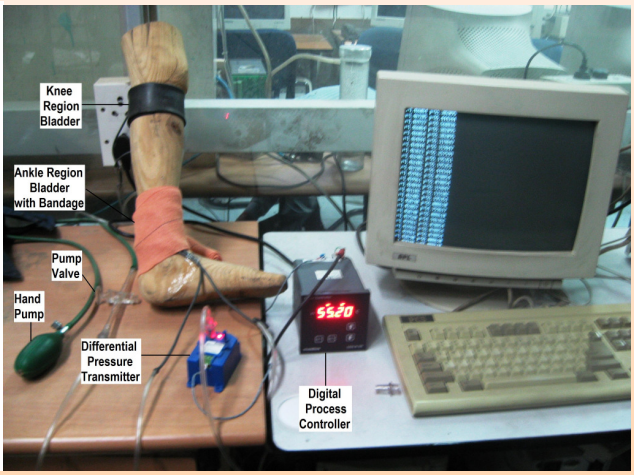


Fig. 2. Photograph of the experimental setup

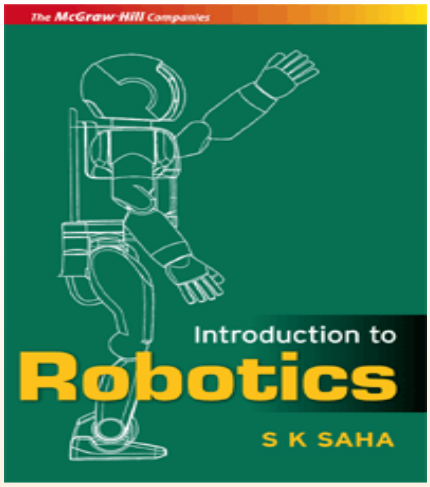
It is clear from the study that as the bandage width increases the pressure developed decreases. This is mainly due to the fact that with decreasing area of the bandage the pressure applied increases for the same winding tension. Two different wrapping directions were used, i.e. from bottom to top and from top to bottom. The study showed that with the change in the wrapping style the pressure exerted on the knee does not change. However the pressure on the ankle was found to change. The probable explanation is that in top to bottom configuration the bandage is not able to grip the ankle region properly which results in reduction in internal pressure, where as in the bottom top configuration, it is able to do so.

[#]Contributed by Dr. A. Das and Dr. R. Alagirusamy, Dept. of Textile Technology, IIT Delhi. For more, please write to Dr. Das (apurba65@gmail.com).

Recently Published Book

Introduction to Robotics by S K Saha

Publisher: Tata McGraw-Hill Pvt. Ltd., New Delhi



Introduction to Robotics is a book which aims to understand the underlying concepts used in designing and building a robot, and to make it work. In an undergraduate curriculum of Robotics, it is important that the students are exposed to both the aspects of analyses and applications. Hence, this book which covers both the aspects in a lucid manner. The material provided in this book can be used by practicing engineers as well for the purposes of adopting, maintaining, and even designing a robot. In fact, with many examples and exercises provided in this book, one can prepare himself or herself for any competitive examination having Robotics as a topic. This book is meant to cater to both the undergraduate (UG) and postgraduate (PG) level students for their courses on Robotics.

Salient Features:

- Unique chapter on Recursive Robot Dynamics introduces methodology for automatic generation of dynamic algorithms
- Comprehensive coverage on Drive systems, Robot control, and Robot applications
- Case Studies - discusses several robot systems with execution guidelines
- Recursive Inverse Dynamics for Industrial Manipulator (RIDIM) and MATLAB based exercises
- Rich pedagogy of 100 solved examples and 141 chapter-end problems

This book has excellent coverage of Robot applications, Homogeneous transformations and Robotic programming etc. It has beautiful photographs that clarify most of the robotic operations.

Forthcoming Events (2009-2010)

The National Conference on Machines and Mechanisms (NaCoMM) is a series of conferences organised by Association for Machines and Mechanisms (AMM), an affiliate of the International Federation for Promotion of Mechanism and Machine Science (IFToMM) on different themes of interest of Machines and Mechanisms once in every two years. In this year, 14th NaCoMM (NaCoMM - 09) is being organised by the Department of Mechanical Engineering, National Institute of Technology Durgapur, India.
Website: **http://nacomm.nitdgp.ac.in/**

ACMD2010

The 5th Asian Conference on Multibody Dynamics

August 23- August 26, 2010

Kyoto University, Kyoto, Japan

The 5th Asian Conference on Multibody Dynamics (ACMD) will be held in Kyoto, Japan, from August 23rd to 26th in 2010. The Asian Conferences on Multibody Dynamics have been regularly hosted by several countries in Asia and Pacific area in turn. Since the ACMD conference was launched in Iwaki (Japan) in 2002, it has been successfully held in Seoul (Korea) in 2004, Tokyo (Japan) in 2006, and Jeju (Korea) in 2008. The main purpose of this conference, ACMD2010 is to enhance scientific and technological exchange and cooperation among engineers over the world in the fields of multibody dynamics and related topics.
Website **http://www.jsme.or.jp/dmc/acmd2010/**