

Association for Machines and Mechanisms News Bulletin

Volume 4, No. 1

January 2012



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 regularly.

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Message from the Vice-President (AMM) and Patron of the News Bulletin

Happy New Year 2012 to all the readers of AMM News Bulletin!

I am extremely happy to share with you the success of our quarterly news bulletin which was revived in January 2009. Since then we have published 12 issues which have been made available online too. I take this opportunity to thank all the Editors-in-Chief who are also the Zonal Vice-Presidents of AMM. They have worked tirelessly during the publication of the issues to bring them almost in a timely manner. In this regard, the contribution of the Secretary of AMM is also worth mentioning, who has diligently proof read all the issues and uploaded the news bulletin to the AMM homepage: <http://www.ammindia.org>.

Even though we were consistent in bringing out the issues, at times it was very difficult to receive appropriate articles. Hence, lately some of the coordinated sections could not be continued. In fact, one of the aims of this news bulletin was to bring out contemporary articles from research-oriented activities and for general awareness, be it a product or something else. The dream associated with the publication has been to gain experience in publishing quality articles so that one day AMM could bring out a quality journal of Indian origin. If our readers dream the same, then I would request them to find time to pen down their thoughts based on their research or application-oriented projects in writing some articles and send them to our editorial team. In this context, I must mention that informative articles, e.g., a new mechanism or a common mechanism in a new application or even a mechanism-oriented product, are also welcome for our news bulletin. I am sure our members (including those who are students) will find such articles valuable.

Prof. S. K. Saha

Vice-President (AMM) and Patron AMM News Bulletin

Design and Development of Wider-Width Handloom **S.L. Soni, Professor, Mechanical Engineering Department** **Malaviya National Institute of Technology, Jaipur (Rajasthan)**

BACKGROUND

Loom is used in weaving fabrics from yarn or other fibres. A woven fabric produced on a loom is made by interlacing two sets of threads at right angles. This research relates to the development of wider width handloom ideal for weaving 90 inch wide fabric. Usually fabrics are woven in long lengths, i.e., 40 to 100 or more yards and from 20 to 60 inches in width. Weaving larger widths require large handlooms which require greater forces to operate the loom. Therefore, wider-width handlooms are not common in practice. At M.N.I.T. Jaipur a light-weight, wider-width handloom has been designed and developed which requires less effort to operate.



Fig. 1: Wider-width handloom

FEATURES OF M.N.I.T. HANDLOOM

- This is light-weight and wider-width (for weaving 90 inch wide fabric) handloom.
- Motions like picking, shedding, and beating are done manually and cloth beam works in contact with emery roller.
- This machine is easy to assemble and disassemble; every part of this machine is easily replaceable.
- The machine can be easily transported because all joints are made of temporary fasteners, i.e., nuts and bolts.
- Good quality pedestal bearings are used in this machine, thus it involves low friction resulting in less power requirement and reduced fatigue to an operator.
- Weight of machine is less because of light-weight rectangular pipes. The beating member is made up of wood.
- The height of the machine is adjustable. Thus, the height of beating member and width of crank etc. can be changed according to cloth required or according to convenience of the operator.
- This handloom can be easily converted to an electric power loom by providing motor to the crank.

NaCoMM-2011: Report from the Conference Chair



NaCoMM 2011
15th National Conference on Machines and Mechanisms
Indian Institute of Technology Madras, Chennai, India
November 30 - December 02, 2011



Conference details and updates:
<http://www.nacomm2011.org>
Email:
nacomm2011@iitm.ac.in



The biggest event of AMM, the National Conference on Machines and Mechanisms (NaCoMM), was organised by the Department of Engineering Design, IIT Madras, during November 30-December 02, 2011. This was the 15th NaCoMM to be organised under the aegis of AMM since 1981.

Prof. Manfred Husty, the Chief Guest at the inauguration, releasing the proceedings



NaCoMM 2011 had attracted more than a hundred participants and contributors, thanks to the enthusiasm shown by AMM members. The programme was also actively supported by AMM's parent organisation, IFToMM. A total of 170 abstracts were submitted for the initial screening, of which 123 made it to the final review. The reviews were conducted in a double-blind mode, and 101 reviewers turned in 281 reviews, which helped identifying 63 papers for oral presentation, and 20 more for the poster session. Most of the papers accepted for oral presentation had received 3 independent reviews. Once again, members of AMM and IFToMM played a major role in the process of reviews. The full papers presented orally, and the abstracts of the posters have been included in the proceedings, which has been published under the title "[Machines and Mechanisms](#)" by Narosa Publishing House.

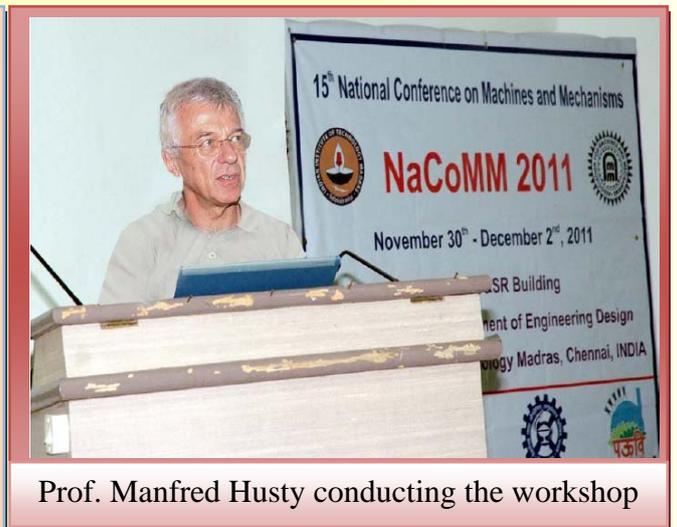
In addition to the presentation of technical papers, the conference programme included a day-long workshop on the kinematics of planar and spatial mechanisms on the first day. Prof. Manfred Husty of University of Innsbruck, Austria, a noted expert in kinematics, conducted the workshop, which was attended by nearly all the participants. Prof. Husty has been kind enough to share his lecture slides and the Maple worksheets used in the workshop, and these would be soon put up at the [NaCoMM 2011 page](#) in the AMM site for free download. It is sincerely hoped that this would help interested researchers to learn more of this beautiful subject.

The conference also included the traditional Prof. K. Lakshminarayana and Prof. B. M. Belgaumkar memorial lectures, delivered by Prof. Ashitava Ghosal (IISc, Bangalore) and Prof. Dr.-Ing. Andrés Kecskeméthy (Editor-in-Chief, Mechanism and Machine Theory) respectively. Prof. Marco Ceccarelli (President, IFToMM) also delivered a keynote lecture.

NaCoMM-2011: Report from the Conference Chair

Starting with 2009, AMM has constituted several awards to promote the quality of research. The best paper award (in the general category) went to the IIT Kanpur team of Shanu Sharma, J. Ramkumar, Shatarupa Thakurta Roy for their work on stair climbing manual wheelchair. The best paper in the students' category was given to Santosh Bhargav, Shanthanu Chakravarthy and G. K. Ananthasuresh from IISc Bangalore for their work on a compliant end-effector for tele-operated tissue cutting with a force-limiting feature. The best paper in the students' category was given to Santosh Bhargav, Shanthanu Chakravarthy and G. K. Ananthasuresh from IISc Bangalore for their work on a compliant end-effector for tele-operated tissue cutting with a force-limiting feature. On behalf of AMM, Prof. Subir Saha and Prof. Ashitava Ghosal selected the best papers. They also announced a "Judges' Award" on the spot, which went to the IIT Madras team of Aditya Soni, Ramanathan Muthuganapathy and Sandipan Bandyopadhyay for their work on a reconfigurable manual tricycle with suspensions.

The Students' Mechanism Design Contest (SMDC 2011) was one of the most important components of NaCoMM 2011. Initially, 17 entries were received across the country from various student groups, and from them 7 were selected for the final demonstration after two rounds of screening. Finally, five teams participated in the event. The best design award went to John Pattery of the Dept. of Engineering Design, IIT Madras, for his cell-phone controlled coconut harvesting robot. Prof. Kecskeméthy (Univ. of Duisburg, Germany), Prof. Pathak (IIT Roorkee), and Mr. Udai (IIT Delhi) were the judges for this event.



Prof. Manfred Husty conducting the workshop



Entries for the SMDC 2011



Organising team at the valedictory function



A scene from the cultural programme

The organising committee wishes to thank all the participants and contributors for their efforts and time in making this event successful. We hope that the participants had enjoyed their time during the conference, and found the sessions, the interactions, the lectures and demonstrations educative and inspiring.

Glimpses of NaCoMM 2011



The 16th NaCoMM would be held in 2013, at IIT Roorkee, with Dr. P. M. Pathak of the Department of Mechanical and Industrial Engineering as the Conference Chair. It is hoped that with the continued support of AMM and IFToMM, NaCoMM would grow bigger and better in the coming years.

Forthcoming Events



The Second ASME/IEEE International Conference on Reconfigurable Mechanisms and Robots (ReMAR 2012)

ReMAR 2012 will be held at Tianjin University, China, during July 09-11, 2012. Established in 1895, Tianjin is the first modern Chinese University.

The main areas of this conference include, but not limited to, the following subjects:

Metamorphic Robotics
Reconfigurable Manufacturing
Reconfigurable Robots
Bio-reconfiguration Engineering
Variable Topology Modelling
Kinematics Dynamics of Reconfiguration

Modular Devices
Bio-metamorphic Robotics
Metamorphic Mechanisms
Reconfigurable Mechanisms
Biological Self-Assembly Mechanisms

For more details please visit <http://www.remar2012.com>.

Minutes of General Body Meeting (GBM) during NaCoMM 2011

The AMM GBM was conducted on December 02, 2011 at IIT Madras, after the conclusion of NaCoMM 2011. Though a large number of AMM members participated in the conference, only 4 members (except the Vice-President and the Secretary of AMM) attended the meeting. On one hand, this allowed detailed discussion on each of the agenda points, while on the other, it was felt that the number was too small for some of the decisions that needed to be made by AMM. It has been therefore accepted that AMM Secretariat would make arrangements for collecting opinions from the members on a number of issues before taking a final decision on them. A summary of the discussions follows.

- It was formally announced that NaCoMM 2013 would be organised by IIT Roorkee, with Prof. P. M. Pathak of the Department of Mechanical and Industrial Engineering as the Conference Chair.
- Unfortunately, the fate of the next IPRoMM could not be decided. In the previous GBM in February 2011 Prof. B. V. A. Rao had staked the claim on behalf of VIT. However, since then there has been no communication from VIT on this matter and no decision could be taken as there was no participation from VIT in the GBM. It is now imperative to find a venue for this event.
- It has been suggested that the name of NaCoMM be changed suitably to reflect its international status. However, the brand value of “NaCoMM” is to be retained as well. Several possibilities were discussed. As mentioned above, a final decision would be taken in the next few months after collecting opinions from the members.
- Prof. G. Saravana Kumar of the Department of Engineering Design, IIT Madras has been selected as the Treasurer of AMM. The previous Treasurer, Prof. Shankar Krishnapillai of the Department of Mechanical Engineering has relinquished his post in August 2011.
- AMM Office Bearers for the term 2012-2016 were to be identified in this GBM. There were no fresh applicants/nominations for any of the posts. Prof. Ghosal of IISc suggested that the current team should continue, which was accepted by all present.
- The issue of introducing a code of conduct for AMM members was discussed in great detail. The matter has acquired urgency and seriousness as it was found during NaCoMM 2011 that some AMM members have resorted to plagiarism in their submissions to the conference. In each such case, an email was sent by the Conference Chair, highlighting the concern and seeking a formal explanation. However, in some cases no response was received. In the days of global awakening about the issues of academic ethics, AMM cannot tolerate such behaviour from its members, more so as most of its members are teachers across the country, and thus supposed to be role models for their students. The following were accepted upon in the meeting:
 - AMM would prepare a code of conduct for its members. All new members would have to agree to it formally while joining. However, the code would apply to existing members as well from the time of its introduction. AMM would hold the right to terminate the membership, and/or ban from AMM activities for a period of time, and/or report to the competent authorities of the member’s organisation at its discretion if a member fails to adhere to the code of conduct.
 - It has been decided that the authors of the plagiarised papers in NaCoMM 2011 would be kept out of all AMM activities for a period of two years, ending with NaCoMM 2013.
- The issue of formalising student membership of AMM was discussed, and it was decided that the AMM Secretary would work with Prof. Saha, the Vice-President, to come up with a new framework for the same.
- On behalf of AMM, Prof. Ghosal wished to put on record a note of appreciation for the NaCoMM 2011 Organising Committee for a well-conducted conference.

Sandipan Bandyopadhyay
Secretary, AMM

Some UG Projects Based on Mechatronics and Mechanisms

Rakesh Sehgal, and Rajesh Sharma

Mechanical Engineering Department, National Institute of Technology Hamirpur (HP)

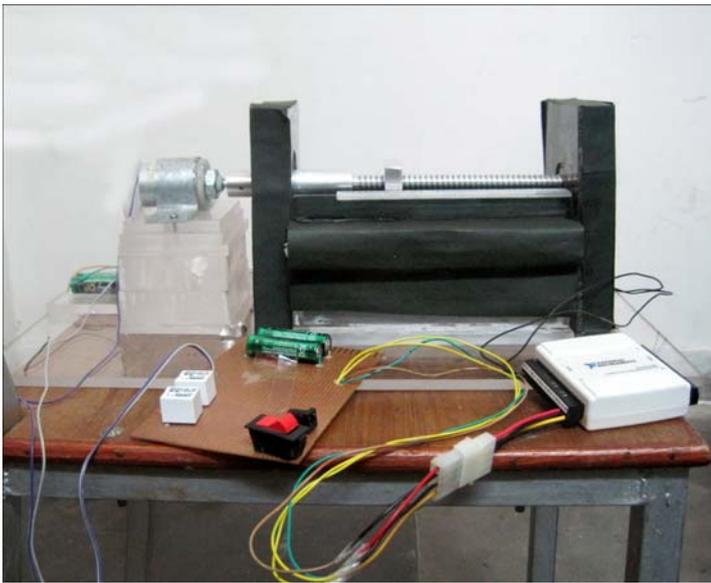


Fig 1: Lead Screw and Control System Setup

The picture of the project shown in Fig. 1 is related to design and manufacturing of a linear screw mechanism and its control unit. The study of linear screw and its control was to understand the fundamentals and working of control systems. The power screw and its follower was designed and manufactured according to the Indian Standards and controlled using a basic DAQ card, DC geared motor and a feedback circuit using LDR, light source, and relays. The graphical programming was done on NI LabVIEW and control was carried out by using a linear feedback circuit. Calibration of the motion of the lead screw follower was done using different light source as a bulb. The motion of the follower could be approximately controlled as desired.

A four-legged walking machine shown in Fig. 2 was designed and fabricated to demonstrate the use of two crank and slotted lever mechanisms in parallel for walking on any type of terrain. The mechanism is capable of executing walking motion with 500 grams payload and can be remotely controlled using a suitable control mechanism. A single high torque, low rpm DC motor was capable of providing sufficient input torque to the mechanism. The mechanism, however, is bit noisy due to imperfections in fabrication and assembly.

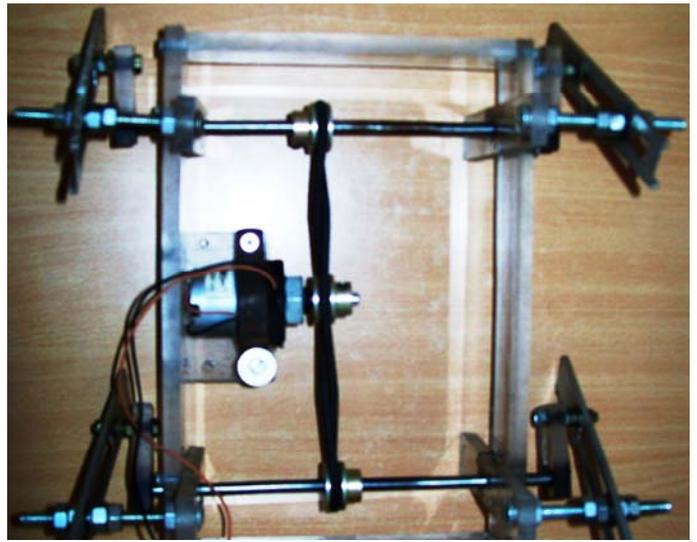


Fig 2: Four-legged Walking Machine

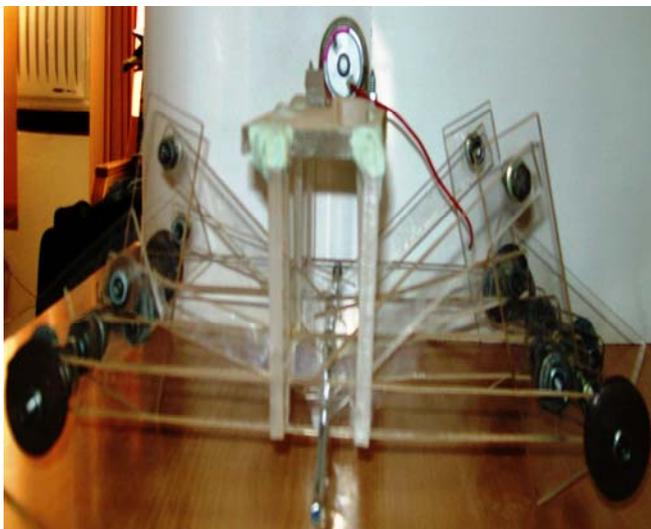


Fig 3: Six-legged Walking Machine

Six-legged walking machine was designed and fabricated to demonstrate the use of three crank and follower mechanisms in parallel (on one side) with a phase difference of 120° for walking on any type of terrain. The mechanism is capable of executing walking, creeping and turning motions with 1 kg payload and can be remotely controlled using a suitable control scheme. Two high torque, low rpm DC motors provide sufficient input torque to the mechanism.



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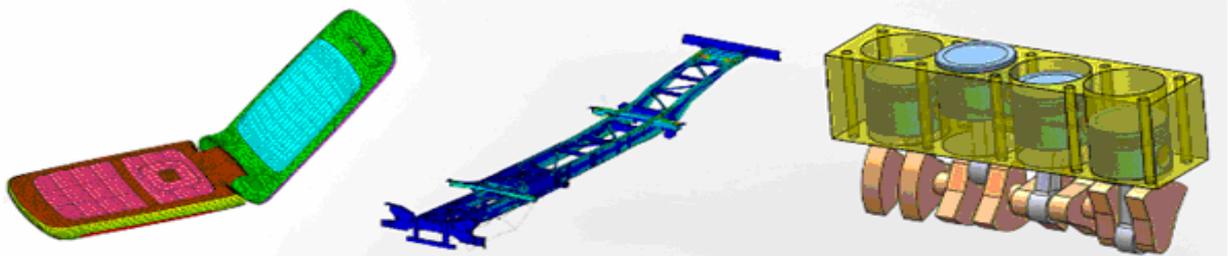
<http://www.functionbay.co.kr>

RecurDyn, based on multi-body dynamics, is the CAE software for multi-physics solutions. Starting with just multi-body dynamics in 2004, **RecurDyn** became the first Multi-Flexible Body Dynamics (MFBD) to integrate multi-body dynamics and non-linear finite element methods into its numerical integrator, which opened the new paradigm in the field of multi-physics CAE.

Today, **RecurDyn** continues to lead the multi-physics CAE field by creating inter-disciplinary CAE software that integrates MFBD, Lubrication, Control, and Design Optimization, all in a single framework.

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