

Book of Abstracts

of

Joint ASNEngr/CAN-USA Conference 2010(3rd ASNEngr Annual Conference and Meeting and 3rd CAN-USA Annual Development Conference)**“Engineering and Science for Sustainability, Clean-
Technology and Disaster Preparedness”****Held at****Boston Park Plaza Hotel & Towers, 50 Park Plaza, Boston, MA
(with 2010 ANA Convention)****during****July 03 - 04, 2010****Edited by****Ramesh B. Malla, Ph.D., Bineet Sharma, Pradeep Khanal
and Amod K Pokhrel, Ph.D.****American Society of Nepalese Engineers (ASNEngr)****P. O. Box 39524, 4904 York Road****Baltimore, Maryland 21212-9998, U.S.A.****Email: info@ASNEngr.org / Web: www.ASNEngr.org****Computer Association of Nepal, USA****P O Box 105, Pleasanton, California 94566, USA****Email: info@can-usa.org / Web: www.can-usa.org**

WELCOME FROM CONFERENCE CHAIRS

On behalf of the Conference Organizing Committee of American Society of Nepalese Engineers (ASNEngr) and Computer Association of Nepal-USA (CAN-USA), we would like to extend our greetings and welcome you to the Joint ASNEngr/CAN-USA Conference 2010 being held in Boston, MA, U.S.A., July 3 - 4, 2010 with the 2010 Annual Convention of the Association of Nepalese in Americas (ANA).

ASNEngr and CAN-USA organize their conferences annually. This conference is the third in the series for each organization, however the first jointly organized. Theme of this joint conference is "Engineering and Science for Sustainability, Clean-Technology and Disaster Preparedness". The objective of the conference is to gather engineers and scientists, who are directly or indirectly affiliated to promote the development pertinent to the scientific, engineering, and other related fields. The conference provides common venue for those engineers, scientists, and related professionals to have a collaborative effort for further research and development.

The technical program includes 4 sessions, including a joint ANMF/ASNEngr/CAN-USA discussion panel on "*Earthquake Disaster Preparedness in Nepal*", two technical sessions on "*Clean Technology*" and "*General Engineering and Science*" related topics with individual presentations, and an "*Open Forum*" to meet and share scientific knowledge amongst the fellow engineers and scientists. The presenters and participants in the technical and panel sessions are engineers, scientists, and related professionals who come from academia, government agencies, and leading private industries. The program covers multi-disciplinary and relevant scientific areas that include but not limited to the mitigation of natural disaster such as landslides and earthquake, sustainable engineering design for infrastructure, bridge design and construction, advanced exploration and structures including on lunar environment, wireless networks/telecommunications and sustainable energy. We would like to express our heartfelt gratitude to the authors who sent us their abstracts on time. We believe that presentations and the forum for discussion at the Conference will give the participants ample opportunities to share the knowledge of research and development in the pertinent area and create a common discussion ground for the further enhancement.

We would like to thank the Conference attendees for taking their valuable time participating and supporting the conference. Thanks are also due to the tireless effort of organizing committee members and the members of the Board of Directors of ASNEngr and Executive Committee of CAN-USA, who provided their invaluable suggestions from time to time to make this event a success.

We are looking forward to meeting and greeting you at the conference.

With warm regards,



Ramesh B. Malla, Ph.D.
Conference General Chair
University of Connecticut
Storrs, CT, USA



Bineet Sharma
Conference General Chair
Pleasanton, CA, USA



Pradeep Khanal
Technical Co-Chair
Intel Corp.
Santa Clara, CA, USA



Amod K Pokhrel, Ph.D.
Technical Co-Chair
University of California
Berkeley, CA, USA

Table of Contents

1.	<i>Title Page</i>	-----	1
2.	<i>Welcome from Conference Chairs</i>	-----	2
3.	Table of Contents	-----	3
4.	<i>ASNEgr and CAN-USA Board and Officers</i>	-----	4
5.	<i>Conference Organizing Committee</i>	-----	5
6.	<i>Overall Program-at-a-Glance</i>	-----	6
7.	<i>Detail Program Schedule</i>	-----	7
8.	<i>Conference Presentations and Abstracts List</i>	-----	10
i.	<i>On Preparing Nepal's Infrastructures for Earthquake Event</i>	-----	11
	<i>Kanhaiya Kayastha, P.E., S.E., La Habra, CA and</i>		
	<i>Ramesh Malla, Ph.D. University of Connecticut, Storrs, CT</i>		
ii.	<i>High altitude Wireless networks in Himalayan Region</i>	-----	13
	<i>Kishor Panth, Computer Association of Nepal, Kathmandu, Nepal</i>		
iii.	<i>Cooperation for Disaster Preparedness: A case for Nepal</i>	-----	14
	<i>Rajan R. Pant, Office of Controller of Certification, Ministry of</i>		
	<i>Science & Technology, Kathmandu, Nepal</i>		
iv.	<i>Energy Generation using Reciprocating Small Scale Hydropower System</i>	----	15
	<i>Ramesh Malla, Ph.D., Binu Shrestha, and Amvrossios C.</i>		
	<i>Bagtzoglou, Ph.D., University of Connecticut, Storrs, CT</i>		
v.	<i>Stoves, Health and Technologies</i>	-----	16
	<i>Amod K Pokhrel, Ph.D., University of California, Berkeley, CA</i>		
vi.	<i>Got Sun? Get Electricity!- Gham Power's Solar PV Systems End Load-Shedding for Homes and Businesses Alike</i>	-----	17
	<i>Sandeep Giri, Gham Power (Solar Company), Kathmandu, Nepal</i>		
vii.	<i>Science and Education for a Sustainable World</i>	-----	18
	<i>Pramod Dhakal, Ph.D., Ottawa, Canada</i>		
viii.	<i>Search and Rescue using Cell Phones and Mobile Base Station</i>	-----	19
	<i>Bishal Thapa, Northeastern University, Boston, MA</i>		
ix.	<i>Meta Analysis on Gene Expression Micro-array data</i>	-----	20
	<i>Pujan Joshi, University of Connecticut, Storrs, CT</i>		
x.	<i>Bridge Foundation Design in Tidal Waterway</i>	-----	21
	<i>Upendra Karna, D. Eng, P.E., U&S Engineers, P.C., Lambertville, NJ</i>		

ASNEngr

EXECUTIVE COMMITTEE AND BOARD OF DIRECTORS

Executive Committee:

Officers:

President: Ramesh B. Malla, Ph.D. (CT)

Vice President: Rajendra K. Shrestha, Ph.D. (TX)

General Secretary: Jagannath Ghimire (MD)

Joint Secretary: Prakash Khanal (SC)

Information Secretary: Komal Dutta (IL)

Treasurer: Pratibha C. Phuyal (IL)

Members-at-Large:

Rajesh Bajracharya (ON, Canada)

Himal Karmacharya (MA)

Upendra Karna, D. Eng., P.E. (NJ)

Pradhuma B. Shrestha, P.E. (TX)

Binod Tiwari, Ph.D. (CA)

Board of Directors:

Ramesh B. Malla, Ph.D. (CT) - Chair

Devendra M. Amatya, Ph.D., P.E. (SC)

Rajendra Bajracharya, Ph.D. P.L.S. (ID)

Rajesh Bajracharya (ONT, Canada)

Subodh Bhandari, Ph.D. (CA)

Rishi Bhattarai, P.E. (TX)

Yubaraj Budhathoki, P.E. (VA)

Komal Dutta (IL)

Naveen Dutta (CO)

Bimal Devkota, P.E. (MD)

Laxman M. Devkota, Ph.D., P.E. (AZ)

Jagannath Ghimire (MD)

Sukh Gurung, Ph.D. (NY)

Upendra L. Joshi, P.E. (CA)

Bimal Karki, P.E. (SC)

Himal Karmacharya (MA)

Pradeep Karna (AZ)

Upendra Karna, D. Eng., P.E. (NJ)

Prakash Khanal (SC)

Raju Kharel (GA)

Prakash B. Malla, Ph.D. (GA)

Usha Neupane (WI)

Sushil Poudyal (ONT, Canada)

Bishnu Phuyal, Ph.D. (IL)

Pratibha Phuyal (IL)

Jambala Ruit, P.E. (PA)

Gopal Shah (Kathmandu, Nepal)

Manish Shakya (SC)

Shyam L. Sharma, Ph.D. (OR)

Pradhuma Shrestha, P.E. (TX)

Pramen Shrestha, Ph.D. P.E. (NV)

Rajendra Shrestha, P.E. (FL)

Rajendra Shrestha, Ph.D. (TX)

Khagendra Thapa, Ph.D. (MI)

Binod Tiwari, Ph.D. (CA)

Upendra Wagley, P.E. (NY)

CAN-USA

EXECUTIVE BOARD AND WORKING COMMITTEES

Executive Board:

Arati Shreshta, Pleasanton, CA

Amod Pokharel, Berkeley, CA

Amrit Pant, Mountain View, CA

Bijay Niraula, Sunnyvale, CA

Bineet Sharma (President), Pleasanton, CA

Binod Bhattarai, Marlborough, MA

Bisow Poudel, Berkeley, CA

Bishnu Poudyal, Santa Clara, CA

Deepak Neupane (Treasurer), Fremont, CA

Dilip A Thakur, Mountain View, CA

Durga P Bhurtel (Counsel), New York, NY

Kshitij Thapaliya, Berkeley, CA

Kobid Dahal, Lynwood, WA

Nabin Acharya, San Jose, CA

Nabin Khanal (First Life Member), Seattle, WA

Prabuddha Dahal (VP), Lufkin, TX

Prajesh Shrestha, Berkeley, CA

Pukar Malla (VP), Boston, MA

Ram Khanal, Atlanta, GA

Sanjay Sharma (VP), Bradenton, FL

Shailesh Bhandari, San Francisco, CA

Shiva Acharya, Denton, TX

Simon Dhungana, Baltimore, MD

Suresh Ojha (General Secretary), Santa Clara, CA

Working Committees:

Editorial Board

Ankeeta Sharma

Pukar Malla

Suresh Ojha (Editor-in-chief)

Networking Events

Kumar Pandey

Niley Shrestha (Chair)

Membership Drive

Deepak Neupane (Co-Chair)

Nabin Acharya (Co-Chair)

Career Management and Mentorship

Nabin Khanal

Pradeep Khanal (Chair)

Prajesh Shreshta

Conference Organizing Committee:**General Chairs:**

Ramesh B. Malla, Ph.D., University of Connecticut, Storrs (CT)

(E-mail: malla@engr.uconn.edu/ Tel: 860-486-3683; Web - <http://engr.uconn.edu/~mallar>)

Bineet Sharma, OnTick, LLC, Pleasanton, CA

(E-mail: bineet@gmail.com/ Tel: 925- 998-5399)

Technical Chairs:

Pradeep Khanal, INTEL, Santa Clara, CA, U.S.A.

(E-mail: pradeepkhanal@gmail.com/ Tel: 408-771-6762)

Amod K Pokhrel, Ph.D., University of California, Berkeley, CA

(E-mail : amod@berkeley.edu/ Tel : 510-847-1243)

Networking Luncheon Program Coordinators:

Jagannath Ghimire, P.E., Rummel, Klepper & Kahl, LLP, Baltimore, MD

(E-mail: jaganghimire@yahoo.com/ Tel: 410-616-9873)

Ananta Risal, Knowledge Interface Inc, Metuchen, NJ

(E-mail: ananta.risal@gmail.com/ Tel: 908-217-6752)

Members:

Ambika Adhikari, D. Des (AZ)

Komal Dutta (IL)

Jagannath Ghimire (MD)

Samana Ghimire (CA)

Mandeep Guragain (CA)

Prakash Khanal (MD)

Pujan Joshi (CT)

Shraddha Joshi (CT)

Prakash B. Malla, Ph.D. (GA)

Bishnu Phuyal, Ph.D. (IL)

Pratibha C. Phuyal (IL)

Prem Rimal, P.E. (CA)

Rajendra K. Shrestha, Ph.D. (TX)

Overall Program Schedule At-a-Glance**Saturday, July 3rd, 2010**

- 12:30 PM – 1:30 PM: Conference Opening *Gandaki (Terrace Room/Basement)*
- 1:45 PM – 3:30 PM: Technical Session I *Gandaki (Terrace Room/Basement)*
(Joint ANMF/ASNEngr/CAN-USA Panel Discussion on Earthquake Disaster Preparedness in Nepal)
- 4:30 PM - 6:00 PM: Technical Session II *Koshi (Whittier Rm, 4th FL)*
(Open Forum)

Sunday, July 04th, 2010

- 10:30 AM – 12:00 PM: Technical Session III *Karnali (Georgian Rm, Mezzanine Level)*
(Joint ASNEngr/CAN-USA Session on Clean Technology)
- 12:00 PM – 1:30 PM: Joint Professional Networking *(TBA)*
(Jointly hosted by ASNEngr, CAN-USA, ANMF, and NKY)
- 1:30 PM – 3:00 PM: Technical Session IV *Karnali (Georgian Rm, Mezzanine Level)*
(General Engineering & Scientific Topics)
- 3:00 PM - 5:00 PM: ASNEngr Annual General Membership/BOD Meeting *Rapti (Gems Rm, 4th FL)*

[Please see the following pages for details.]

Detail Program Schedule

Saturday, July 03rd, 2010

Conference Opening 12:30 PM – 1:30 PM

Gandaki (Terrace Room/Basement)

Conference Opening Remarks, Introduction and Volunteer of the Year Award

Ramesh B. Malla, Ph.D., President, ASNEngr and Conference General Chair, and **Pukar Malla, Ph.D.**, Vice- President, CAN-USA

Technical Session I 1:45 PM – 3:30 PM
Room/Basement)

Gandaki (Terrace

Session Title: Panel Discussion on Earthquake Disaster Preparedness in Nepal

Session Chairs: Pramod Dhakal, Ph.D., Executive Director, Canada Foundation for Nepal, Ottawa, Ontario, CANADA and **Jagannath Ghimire, P.E.**, Engineer, RK&K, LLC, Baltimore, MD

Panelists:

Ramesh Malla, Ph.D., University of Connecticut, Storrs, CT and **Kanhaiya Kayastha, P.E., S.E.**, La. Habra, CA (ASNEngr)

"On Preparing Nepal's Infrastructures for Earthquake Event"

Prabudhda Dahal, Lufkin, TX (CAN-USA)

"Communications in Disaster Preparedness" (Webinar)

Rajan R. Pant, Office of Controller of Certification, Ministry of Science & Technology, Nepal

"Cooperation for Disaster Preparedness: A case for Nepal"

Detail Program Schedule (Cont'd...)

Technical Session II 4:30 PM – 6:00 PM

Koshi (Whittier Rm, 4th FL)

Session Title: *Open Forum*

Session Chair: Ramesh B. Malla, Ph.D., Associate Professor, Civil & Environmental Engineering, University of Connecticut, Storrs, CT
*(** All who have education, training, experience and interest in engineering, scientific and technology areas are welcome to attend, introduce themselves, and share their experience and knowledge with others in attendance in the session. Students are particularly invited and most welcome to this Open Forum session! **)*

Sunday, July 04th, 2010

Technical Session III 10:30 AM – 12:00 PM

Karnali (Georgian Rm, Mezzanine Level)

Session Title: *Clean Technology*

Session Chairs: Uendra Karna, D. Eng., P.E., President, U&S Engineers, P.C., Lambertville, NJ and **Rajan R. Pant**, Controller, Office of Controller of Certification, Ministry of Science & Technology, Nepal

10:30 AM – 10:52 AM

“Energy Generation using Reciprocating Small Scale Hydropower System” by **Ramesh B. Malla, Ph.D.; Binu Shrestha;** and **Amvrossios C. Bagtzoglou, Ph.D.**, University of Connecticut, Storrs, CT

10:52 AM – 11:14 AM

“Stoves, Health and Technologies:” (Webinar) by **Amod Pokhrel, Ph.D.**, University of California, Berkeley, CA

11:14 AM – 11:37 AM

“High altitude Wireless networks in Himalayan Region” by **Kishor Panth**, Computer Association of Nepal, Kathmandu, Nepal

11:37 AM – 12:00 PM

“Got Sun? Get Electricity!- Gham Power’s Solar PV Systems End Load-Shedding for Homes and Businesses Alike”(Webinar) by **Sandeep Giri**, Gham Power (Solar Company), Kathmandu, Nepal

Joint Professional Networking Event 12:00 PM – 01:30 PM

(TBA)

(Jointly hosted by ASNEngr, CAN-USA, ANMF and NKY)

Detail Program Schedule (Cont'd...)

Technical Session IV 01:30 PM – 3:00 PM Karnali (Georgian Rm, Mezzanine Level)

Session Title: *General Engineering & Scientific Topics*

Session Chairs: **Ramesh B. Malla, Ph.D.**, Associate Professor, Civil & Environmental Engineering, University of Connecticut, Storrs, CT and President, American Society of Nepalese Engineers; and **Kishor Panth**, 2nd Vice President, Computer Association of Nepal, Kathmandu, Nepal

1:30 PM – 1:52 PM

"Science and Education for a Sustainable World" by **Pramod Dhakal, Ph.D.**, Canada Foundation for Nepal, Ottawa, Canada

1:52 PM – 2:14 PM

"Meta Analysis on Gene Expression Micro-array data" by **Pujan Joshi**, University of Connecticut, Storrs, CT

2:14 PM – 2:37 PM

"Search and Rescue using Cell Phones and Mobile Base Station" by **Bishal Thapa**, Northeastern University, Boston, MA

2:37 PM – 3:00 PM

"Bridge Foundation Design in Tidal Waterway" by **Upendra Karna**, D. Eng, P.E., U&S Engineers, P.C., Lambertville, NJ

Annual ASNEngr General Membership Meeting and Closing Rapti (Gems Rm, 4th FL)

3:00 PM – 5:00 PM: ASNEngr Annual General Membership/BOD Meeting and Closing

CONFERENCE PRESENTATIONS AND ABSTRACTS

On Preparing Nepal's Infrastructures for Earthquake Event

Kanhaiya Kayastha, P.E., S.E., La Habra, CA and **Ramesh Malla, Ph.D.** University of Connecticut, Storrs, CT

High altitude Wireless networks in Himalayan Region

Kishor Panth, Computer Association of Nepal, Kathmandu, Nepal

Cooperation for Disaster Preparedness: A case for Nepal

Rajan R. Pant, Office of Controller of Certification, Ministry of Science & Technology, Kathmandu, Nepal

Energy Generation using Reciprocating Small Scale Hydropower System

Ramesh Malla, Ph.D., **Binu Shrestha**, and **Amvrossios C. Bagtzoglou, Ph.D.**, University of Connecticut, Storrs, CT

Stoves, Health and Technologies

Amod K Pokhrel, Ph.D., University of California, Berkeley, CA

Got Sun? Get Electricity!- Gham Power's Solar PV Systems End Load-Shedding for Homes and Businesses Alike

Sandeep Giri, Gham Power (Solar Company), Kathmandu, Nepal

Science and Education for a Sustainable World

Pramod Dhakal, Ph.D., Ottawa, Canada

Search and Rescue using Cell Phones and Mobile Base Station

Bishal Thapa, Northeastern University, Boston, MA

Meta Analysis on Gene Expression Micro-array data

Pujan Joshi, University of Connecticut, Storrs, CT

Bridge Foundation Design in Tidal Waterway

Upendra Karna, D. Eng, P.E., U&S Engineers, P.C., Lambertville, NJ

On Preparing Nepal's Infrastructures for Earthquake Event

By

Kanhaiya Kayastha¹, M.S., P.E., S.E.

La Habra, CA 90631, U.S.A.

and

Ramesh B. Malla²⁺, Ph.D

Department of Civil & Environmental Engineering

University of Connecticut, Storrs, CT 06269-2037, U.S.A.

Abstract

The recent Haitian Earthquake of January 12, 2010 (Magnitude 7.0) and the Chilean Earthquake of February 27, 2010 (Magnitude 8.8) have brought heightened awareness and urgency of making existing and new infrastructures in Nepal safer in the event of an earthquake. The Haitian earthquake took approximately 200,000 human lives; roughly half of the buildings in Haitian capital, Port-au-Prince, have been destroyed; and one million people became homeless. The severe devastation caused in Haiti was attributed to shoddy building construction due to lack of building standards and a national building code. Engineers and scientists, however, believe that a strict adherence to building codes and standards helps prevent the huge loss of lives and properties from the earthquake disasters, as is evident from the Chilean earthquake of a much bigger magnitude than that of Haiti, but caused nearly 800 lives which is a very small number compared to Haiti.

According to United Nation's study, Nepal is placed top 11th in the ranking of earthquake-prone countries. Nepal is also placed in a zone that has the highest probability of risk and the greatest potential of major damage of buildings and infrastructure during an earthquake episode. Geologists believe that Kathmandu, Capital of Nepal, is built on the soft sediment of a former lakebed, which contributes to a higher level of earthquake risk in the valley. In addition, the growth of population and the rapid construction of high-rise apartment buildings in recent years, without adhering to a strict infrastructure building and construction codes, have imposed additional challenges.

Although Nepal has progressed significantly in the area of emergency preparedness and disaster relief programs by conducting various earthquake awareness programs to general public, including, but not limited to observing the annual "The Earthquake Safety Day" on January 16th (to remember the 1934

(Continue to next page)

¹Consulting Civil & Structural Engineer, Vice-Chair, Technical Committee and Fellow (Life) of American Society of Nepalese Engineers (ASNEngr), Fellow, American Society of Civil Engineers (ASCE), and Member, Structural Engineers Association of Southern California; Past President and current Member of Board of Advisors, American-Nepal Society of California, Inc.; E-Mail: kkayastha@aol.com.

²⁺Associate Professor, Founding President and Fellow (Life) of American Society of Nepalese Engineers (ASNEngr); Member, American Society of Civil Engineers (ASCE), American Society of Mechanical Engineers (ASME), American Academy of Mechanics (AAM); and Associate Fellow, American Institute of Aeronautics and Astronautics (AIAA); Tel. (860)-486-3683; E-Mail: MallaR@engr.uconn.edu; Website – <http://www.ASNEngr.org/~mallar> (Corresponding author).

catastrophic earthquake), a lot has still to be achieved in many areas in order to combat efficiently to the possible disasters from a large-scale earthquake, like that of Haiti. In addition, the availability of limited resources in Kathmandu Valley, with a handful of fire trucks in operation, only one functional (domestic plus international) airport, and a few highways connecting the Valley, are going to be a big bottleneck in the emergency and rescue operations, during and post earthquake events.

This presentation looks briefly into the history of earthquake events in Nepal and other neighboring countries in recent past, discusses briefly the various activities that have been in place, educating general public and on the current building codes, and presents some recommendations that are needed to help make essential infrastructures, such as building, bridges, roads, and utility structures safer and more resilient under earthquake event.

In this effort, the joint initiative launched in March 2010 by three voluntary engineering/scientific/medical organizations based in USA, namely, American Society of Nepalese Engineers (ASNEngr), American-Nepal Medical Foundation (ANMF), and Computer Association of Nepal (CAN)-USA, teamed with several other Nepali organizations in the U.S. and beyond, and relevant organizations in Nepal, has paved a solid path towards bringing Nepalese Diaspora together for the goal of help Nepal becoming an earthquake safe country.

High altitude Wireless networks in Himalayan Region

Kishor Panth¹

Computer Association of Nepal (CAN) and Nepal Research and Education Network (NREN)
Kathmandu, Nepal

Abstract

Melting glaciers is a global concern of the modern world. Entire Himalayan region is seriously affected from this emerging issue. As the components of environment preservation efforts, NREN has set up wireless network for the observation of potentially risk Imza Tsho Glacier Lake, by the support of Keio University of Japan. Due to the unexpected expansion of its size, it creates most potential threat to the Himalayan region.

The project has set up two Field server equipped with web-camera enclosed within a protective shield installed close to the end moraine of Imja Tsho and three field servers at Namche Bazar. The camera with 360° view angle relays image of the lake through Internet every 10 minute along with atmospheric data from the sensors. The project has deployed five (Air temp, Humidity, Solar Radiation, UV Radiation & CO2 concentration) sensors. These data are being regularly transmitted and can be accessed through Internet interface (<http://fsds.dc.affrc.go.jp/data4/Himalayan/>). The data is being uplinked through ISP facility in Namche Bazaar which is networked with the monitoring unit through relay points at Chhukung- ri and Quangde. As the period of three years the projects have collected vital information relate to forecast the Himalayan climate.

¹Vice President, Computer Association of Nepal (CAN) and Board Member, Nepal Research and Education Network; E-Mail: kipanth@cisco.com

Cooperation for Disaster Preparedness: A case for Nepal

Rajan R. Pant¹

Office of Controller of Certification, Ministry of Science & Technology, Nepal

Abstract

A country known for having the highest peak of the world, land of mountain, land of Buddha, land of rich in the culture, land of brave people Nepal, is rich in the natural beauty and same time the country is also rich in having the risk of the different types of natural disaster and it has been shown from the past different disaster incidents that had made huge loss of property, land, and human capital of the country. Nepal is exposed to most disaster types including earthquakes, floods, landslides, droughts, storms, avalanches, hailstorms, fires, epidemics and ecological hazards. A wide range of physiological, geological, ecological, meteorological and demographic factors contribute to the vulnerability of the country to disasters. Major factors contributing to disasters are rapid population growth, slow economic development, a high degree of environmental degradation, fragility of the land mass and high elevation of the mounting slopes, unavailability of the technology. It is required to have the preparedness for this type of disaster in Nepal. In this presentation the presenter will show the different types of disaster and its preparedness from the government and non-government organization and what action had been taken for the different past disaster and what had been learned the lesson from those incidents for the preparedness. Apart from the natural disaster this presentation will show the preparedness required for other disaster focusing the present situation of Nepal. This paper will give the idea about the technology available in Nepal for the disaster management and focus on provide the detail roadmap of the co-operation required for the disaster preparedness with whom, what and how.

¹Controller, Office of Controller of Certification, Ministry of Science & Technology, Kathmandu, Nepal;
E-Mail: rajan@cca.gov.np

Energy Generation using Reciprocating Small Scale Hydropower System

Ramesh B. Malla, Ph.D.¹⁺, Binu Shrestha², and Amvrossios Bagtzoglou³

Department of Civil & Environmental Engineering
University of Connecticut, Storrs, CT 06269-2037, U.S.A

Abstract

Energy can be generated constantly and stored from an ambient source such as fluid in motion. This process is known as energy harvesting. The most conventional energy harvesting from water movement is the hydropower which is generally for the large energy production with either high flow discharge or high head for water movement or both. But at an especially remote location where wireless system or sensors have to be powered or batteries have to be charged large energy production is not necessary. At such places energy can be harvested from the reciprocating motion of a properly design structural system created by the fluid motion. River, stream flow, wave and current power generation is categorized as low- head hydropower. Hydropower systems developed to date for low-head water movement require substantial flow rate. The hydropower system discussed here is a unique system that can take advantage of low head as well as low flow to produce energy.

The objective of this paper is to study concept behind a reciprocating hydropower model and to optimize the lift force generated from the system with analytical modeling and lab tests. A finite element analysis of the model is also done to understand the displacements and forces created.

The technology is based on the fact that flow past a rotating cylinder results in the generation of extra lift. It is known as the Magnus Effect. The lift force on rotating body in fluid takes place from the side where cylinder rotation and fluid flow are oriented opposite to each other to the side where they have same direction. The Reciprocating small hydropower system studied here consists of a rotating cylinder and a moving piston at opposite sides with hinge in the middle (Fig. 1) to facilitate see-saw (up and down) motion between them. This alternating movement of the piston can be used to generate power using electromagnetic, piezoelectric or electrostatic mechanisms.

Laboratory tests on a prototype system were done for different angular speeds of the cylinder and velocities of water flow. The lift force on the top of the piston was measured using a load sensor and LVDT was used to record the displacement pattern of the piston with the generated lift force. A 3-dimensional finite element analysis was also performed using ABAQUS software code to simulate the structural response. Two methods of power harvesting from the output displacement obtained from the hydropower system are discussed. Results these various tests and simulations have been presented.

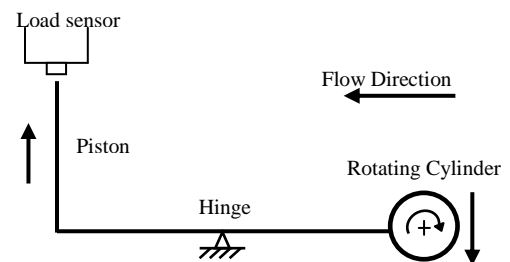


Fig. 1: Schematic of Lift force measurement

Acknowledgment: Financial support obtained from e-Gen LLC for this project is gratefully appreciated.

¹⁺ Associate Professor, Founding President and Fellow (Life) of American Society of Nepalese Engineers (ASNEngr); Tel. (860)-486-3683/E-Mail: MallaR@engr.uconn.edu (*Corresponding author*).

² Graduate Research Assistant; E-Mail: binu.shrestha@engr.uconn.edu

³ Professor and Head of Department; E-Mail: acb@engr.uconn.edu

Stoves, Health and Technologies: Potential Collaboration of Health and Engineering Communities to Reduce the Burden of Disease in Nepal

Amod K Pokhrel, Ph.D.¹

University of California, Berkeley, CA

Abstract

Nepal's energy supply is dominated by solid fuels (biomass based) followed by liquid (kerosene, petrol and diesel) and gaseous (liquefied petroleum gas-LPG and biogas) fuels. In 90% of households, solid fuels are burned in an unvented stove in poorly ventilated rooms. As the stoves are not energy efficient, fuels are not burned completely. The incomplete combustion releases a complex mixture of pollutants. In addition to biomass fuel, burning of kerosene in wick stove or wick lamp also emits complex mixture of pollutants. A number of studies have suggested that exposure to indoor air pollution (IAP) from household solid fuel or kerosene increases the risk for several diseases, particularly in women and children, who receive the highest exposures. In our recent study, conducted in Nepal, use of solid fuel as a heating fuel and kerosene, in stoves and lamps has shown increasing risk of tuberculosis (TB) disease in women. Use of low-emission biomass stoves, such as semi-gasifier stoves or those with cleaner burning fuels (biogas or LPG) for cooking, and replacement of wick lamps with solar lamps or cleaner burning devices as a lighting source could minimize the risk of several disease including TB in Nepal. Alternatively, a solution could be found by promoting culturally appropriate low emission biomass stove with inbuilt thermoelectric generator that generates electricity to burn LED lamp or charge cell phone. Such stoves could also be used in situation like earth quake disaster. An improvement in health, livelihood and quality of life of people in rural Nepal is possible by combining experience and expertise of health and engineering community of Nepali Diasporas. Some solutions that may address issues related to energy and health from household energy technologies will be discussed and presented during the conference.

¹Founding member, Computer Association of Nepal-USA (CAN-USA); E-mail: amodpokhrel@yahoo.com; amod@berkeley.edu

Got Sun? Get Electricity!- Gham Power's Solar PV Systems End Load-Shedding for Homes and Businesses Alike

Sandeep Giri¹

President, Gham Power (Solar Company), Kathmandu

Abstract

It is no secret the Nepalis immensely suffer from 12-plus hours of load-shedding per day because hydropower production has failed to meet the country's needs. The backup options are diesel generator and inverter-battery sets, both of which are not viable in long-term. Solar PV is a promising alternative to address this situation, as evidenced by Gham Power, the fastest-growing company in Nepal that provides solar PV systems for urban homes and businesses. Unlike diesel generators which are dirty, loud, and depend on the infrequent supply of diesel in Nepali market (not to mention the adverse environmental impact of diesel), Gham Power's Solar PV systems generate electricity 100% on their own, independent of the utility company, and at costs lower than diesel generators and inverter-battery sets.

To date, Gham Power has installed 30 Kilowatts (KW) of solar, powering about 60 households and a 4-kilowatt streetlight system at a Buddhist Monastery. Gham Power plans to scale aggressively and serve urban markets throughout the country, and venture into building PV power plants that sell electricity directly to the utility.

This presentation will share case studies from Gham Power's PV installations in Nepal, describe the feasibility of Solar PV in Nepal, and discuss how Nepalis in America can help promote clean and sustainable energy development in Nepal.

¹Sandeep Giri is the President of Gham Power, first company to bring #1-ranked American solar PV technology to Nepal. Mr. Giri lives in San Francisco, California (USA), where he launched several technology companies, including an off-shore software company in Kathmandu. In 2009, his Kathmandu office was impacted by the load-shedding crisis in Nepal, so he launched Gham Power to provide quality solar technology for Nepali homes and businesses at affordable prices. Mr. Giri holds a Master's degree in Computer Science and a certificate in Solar Energy from University of California at Berkeley. E-Mail: sandeep_giri@yahoo.com

Science and Education for a Sustainable World

Pramod Dhakal, Ph.D.¹

Ottawa, Canada

Abstract

There are plenty of atoms in Nepal for the study of particle physics, plenty of materials for the study of material science, lives for life sciences, diseases for health and medicine, and problems for espousing critical thinking and innovation. Yet the contemporary education system and educators have been confined to an effortful absorption and memorization of events, facts, procedures, and theories while contemplation and critical thinking remain merely as some important terms whose definitions are worth memorizing. That the economy of the entire world is inching to commoditize the knowledge to buy and sell in the open market, thereby giving rise to a knowledge economy, Nepal cannot afford to forever remain in the *absorptive* state when it comes to the affairs of knowledge. Thus the question remains, when and how can it be *consolidating*, *creating*, and *emanating* knowledge? This article concentrates on the areas of sciences where Nepal can develop a competitive edge in the era of knowledge economy and sustainable development.

¹E-Mail: pdhakal@gmail.com

Search and Rescue using Cell Phones and Mobile Base Station

Bishal Thapa¹

Graduate Student, Northeastern University, Boston, MA

Abstract

Mobile phones are ubiquitous and can significantly help in search and rescue missions. We propose a set of hardware/software solutions for localization disaster survivors using mobile base stations equipped with smart steerable antennas. The base stations can be deployed as software radio platforms carried by mobile robots or human rescue team in the disaster area. The proposed system, mechanisms, and algorithms exploit the basic functionality of cell phone communications and can operate even with legacy phones without the need for additional applications. Our entire system can be built for the cost of couple of thousand dollars versus the millions of dollars that traditional search and rescue systems cost.

¹Ph.D. Graduate Student; E-Mail: thapa.b@husky.neu.edu

Meta Analysis on Gene Expression Micro-array data

Pujan Joshi¹

Department of Computer Science and Engineering
University of Connecticut
Storrs, CT 06269, U.S.A

Abstract

Challenges of micro-array data analysis include integrating various bio-informatics resources for the best interpretation from the massive amount of expression data and presenting the analysis outcome in a format that is easy to follow by biologists. In this work, we present a comprehensive computational system that narrows down biological hypotheses by integrating gene expression patterns, outcomes from transcription factor binding site analysis, and outcomes from GO enrichment analysis. This system starts with identifying similarly behaving groups of genes from the micro-array experiment and then carries out binding site analysis and gene function enrichment analysis based on some selective significant clusters. The output is a set of "putative" pair-wise relationships between transcription factors and target genes that are likely to hold true within the given experimental context. We demonstrate that some of the hypothesized pair-wise relationships are already reported in the literature. The relationships that have not been reported could be a good set of leads that merit further examination.

¹Research Associate; Member, American Society of Nepalese Engineers (ASNEngr);
E-mail: PujanJoshi@engr.uconn.edu

Bridge Foundation Design in Tidal Waterway

Upendra Karna,¹ D. Eng, P.E.
U&S Engineers, P.C., Lambertville, NJ

Abstract

(Not available to publish. Author can be contacted for information.)

¹President, U&S Engineers, P.C.; Fellow (Life), Chair of Liaison Committee, and Member, Board of Directors, American Society of Nepalese Engineers (ASNEng); E-mail: ukarna@usengr.com