

NEA DAY 2012
Yoshida Campus, Kyoto
21 July 2012

INTRODUCTION

The program in Kyoto was organized at Yoshida Campus of Kyoto University. The program started with a welcome/opening address from *Er. Rishi Ram Parajuli* (Member of Event management Committee). *Er. Parajuli* expressed sincere vote of thanks to all the participants and guests on behalf of the organizing committee. Core part of the program was divided into two technical sessions.

Two papers were presented in both the sessions. The first session was chaired by *Er. Dr. Hari Ram Parajuli* and the second one by *Er. Dr. Surendra Tamrakar*. After each presentation, discussions were made with the experts from the audience moderated by respective chairpersons. The discussions were very much interactive, lively and impressive. Both chairpersons expressed their views regarding NEA DAY as well as some fruitful suggestions to all the participants. Finally, the seminar was formally closed with concluding remarks from *Er. Dr. Kshitij Charan Shrestha*. The program was attended by 11 participants from four universities.

PRESENTATIONS AND DISCUSSION

Four papers were presented in two technical sessions followed subsequently by group discussion. A brief summary of each of the presentations is given below in the order of presentation.

1. Title: *Possibility of high- purity GaAs for high efficient spatial light modulator*

Speaker: *Er. Dr. Madhu Sudan Kayastha, Chubu University*

Summary: This presentation reports my experience on growing high-purity GaAs epilayer as well as fabrication of device using GaAs epilayer during my doctoral course. The GaAs epitaxial layers were grown on semi-insulating (SI) (100) GaAs substrates using Liquid Phase Epitaxy (LPE). They were grown inside a quartz tube, utilizing a conventional sliding boat made of highly concentrated pure graphite (Poco Graphite DFP3-2) under a palladium-purified hydrogen carrier gas ambient. The source material was mainly an undoped GaAs polycrystal and Ga metal. The possibility of high-purity GaAs for fabrication of high efficient spatial light modulator will be discussed.

2. Title: *Potentials of superelastic alloy bars in structural engineering*

Speaker: *Dr. Kshitij Charan Shrestha, Kyoto University*

Summary: This presentation reports on preliminary works done in development of new class of Cu-based shape memory alloys (SMAs) and their application to structural engineering problems. Recent developments have been made on use of shape memory alloys (SMAs) on structural engineering fields, since they can dissipate energy by stress–strain hysteresis, recover deformation upon unloading by superelasticity, and limit force transmission due to stress plateau. SMAs are identified by their two distinct and unique features, first, shape recovery by application of heat, and second, shape recovery upon unloading. The later feature is called superelasticity and SMAs having superelasticity at room temperature are also called superelastic alloys (SEAs). The present study concentrates on application of high performance SEA bars as partial replacement to the conventional steel reinforcing bars (rebars) on structural engineering problems. The distinct feature of these newly developed Cu-based SEAs is that, they have mechanical properties comparable, or even superior in some sense, to Ni-Ti SEAs and additionally Cu-based SEAs offer low material cost and high machinability. This presentation reports on on-going works on masonry, reinforced concrete and steel brace framed structures, with future directions in application of the SEAs to self-healing concrete.

3. Title: *Risk based routing and scheduling of hazardous material in urban areas*

Speaker: *Er. Dr. Rojee Pradhananga, Kyoto University*

Summary: This study presents a risk based routing and scheduling of hazardous material. A single objective formulation has been presented with objective to minimize sum of the two risk components: the risk to traffic and the risk to the exposed population. A vehicle routing and scheduling problem with time windows for distribution of gasoline in part of Osaka road network was solved. The problem was solved using Ant Colony System-based algorithms and was compared with optimal routes obtained considering population based and congestion based risk, respectively as the sole criterion.

4. Title: *Potential Analysis of climatic variability and snow cover in the Kaligandaki river basin, Himalaya, Nepal*

Speaker: *Er. Mr. Bhogendra Mishra, Kyoto University*

Summary Various remote sensing products and observed datasets were used to determine spatial and temporal trends in climatic variables and their relationship with

snow cover area in the higher Himalayas in Nepal. While remote sensing techniques can detect spatial as well as temporal patterns in temperature and snow cover across the inaccessible terrain, the precipitation data obtained from remote sensing does not seem accurate. Non-parametric methods (i.e., the Mann-Kendall method and Sen's slope) were used to identify trends in climatic variables. Increasing trends in temperature, approximately by $0.03^{\circ}\text{C}/\text{y}$, and mixed trends in seasonal precipitation were found for the studied basin. The accuracy of MOD10A1 snow cover and fractional snow cover in the Himalayas was assessed with respect to the ASTER based snow cover area. With increasing trends in winter temperature and decreasing trends in winter and spring precipitation, a significant negative trend in snow cover area during these seasons was also identified. Results clearly indicate the impact of global warming on precipitation and snow cover area in the Himalayas, and further investigations about water availability and extreme hydrologic events are required.

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KYOTO PROGRAM IN PICTURES



