

Lombok-Indonesia. December, 1th-2nd 2016

ICST 2016

**The 1st International Conference on
Science and Technology
(Revised Edition-1)**



PROCEEDINGS

“ Emerging Innovation on Science and Technology for Sustainable Development ”

Supported by



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Proceedings

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KEYNOTE SPEAKERS

Keynote Speaker	Name and Institution	Country
Keynote Speaker 1	Prof. Dr. Akihiro Hazama, MD , Fukushima Medical University	Japan
Keynote Speaker 2	Prof. Dr. dr. Mulyanto , University of Mataram	Indonesia
Keynote Speaker 3	Prof. Hyun Jin Park , Korea University	South Korea
Keynote Speaker 4	Prof. Dr. Anil Kumar A , Asian Institute of Technology, Bangkok	Thailand
Keynote Speaker 5	Prof. Yudi Pranoto , Gadjah Mada University	Indonesia
Keynote Speaker 6	Prof. Amin Ismail , University Putra Malaysia,	Malaysia
Keynote Speaker 7	Prof. Dr. Ing. Mitra Djamal , Bandung Institute of Technology	Indonesia

**THE 1ST INTERNATIONAL CONFERENCE ON SCIENCE AND TECHNOLOGY
(THE 1ST ICST UNIVERSITY OF MATARAM
Mataram, Indonesia, November 30th to Desember 3rd, 2016**

TIME	AGENDA			MODERATOR			PIC		
Day 1 : Wednesday, November 30 th , 2016									
16.00-18.00	Registration ICST Secretariat, JL. Majapahit 62A Mataram						Organizing Committee		
END OF DAY 1									
Day 2 : Thursday, December 1 th , 2016									
08.00-09.00	Registration University of Mataram Dome (Prof Sunarpi Building) JL. Majapahit 62A Mataram						Organizing Committee		
09.00-10.00	OPENING CEREMONY Location: University of Mataram Dome (Prof Sunarpi Building) JL. Majapahit 62A Mataram						Drh. Made Sriasih, M.Agr.Sc., Ph.D(MC)		
09.00-09.05	Do'a								
09.05-09.10	Indonesia Anthem			Chair: Laily Mardiana,S.SI., M.Si					
09.05-09.10	Welcome Speech			The Chairman of 1 st ICST Dr. Ir. Satrijo Saloko., M.Si					
09.35-10.00	Morning Break Poster Session						Organizing Committee		
10.00-11.15	Keynote Speaker Presentation 1 Location: University of Mataram Dome			Moderator: Prof.Surya Hadi, Ph.D			Notulen: Dr. Rahadi Wirawan		
10.00-10.35	Keynote Speaker-1 Health			Prof. Dr. Akihiro Hazama, MD Fukushima Medical University, Japan					
10.35-11.15	Keynote Speaker-2 Distribution Of Hepatitis B Virus Genotypes in Indonesia: Implication For Infection Control Measures			Prof. Dr. dr. Mulyanto , University of Mataram, Indonesia					
11.15-11.20	GAP								
11.20-13.05	Keynote Speaker Presentation 2 Location: University of Mataram Dome			Moderator: Prof.Ir.Sri Widyastuti,M.App.Sc.,Ph.D			Notulen: Dr.Satrijo Saloko		
11.20-11.55	Keynote Speaker-3 Bioscience and Functional Foods			Prof. Hyun Jin Park, Korea University					
11.55-12.30	Keynote Speaker-4 Nanotechnology			Prof. Dr. Anil Kumar A, AIT Thailand					
12.30-13.05	Keynote Speaker-5 Biopolymer			Prof. Yudi Pranoto , Gadjah Mada University, Indonesia					
13.05-14.00	Break Poster Session								
14.00-16.15	Parallel Session Faculty of Food Technology and Agroindustry, University of Mataram JL. Majapahit 62 Mataram Room 1 to Room 8, Level 3								
14.00-15.00	Room 1 SCIENCE Moderator: Dr.Rahadi W Notulen: Aluh N	Room 2 HEALTH Moderator: Dr. Yunita Sabrina,Ph.D Notulen: Nanda	Room 3 FOOD SCIENCE Moderator Dr. Satrijo S Notulen: Dewi	Room 3 FOOD SCIENCE Moderator: Dr. Bambang HK Notulen : Mursal	Room 5 ANIMAL SCIENCE Moderator: M.Sriasih, Ph.D Notulen:Guyub	Room 6 ENGINEERIN G Moderator: Akmalludin, ST.,Ph.D Notulen:Lili	Room 7 SOCIAL HUMANIORA Moderator: Kamaludin Yusra,Ph.D Notulen:Irfan	Room 8 SCIENCE(MIX) Moderator: Sulaiman ND.,Ph.D Notulen:Nunik	
14.00	003_Lisa F	007_Taufik H	005_Endrika	008_DesiA	025_Hariadi	012_Salman	001_Kurroti	035_Yuliana A	
14.10	009_Rudy S	017_Sudarma	116_Zainuri	023_Nurul H	029_Mujahid I	013_Yudi P	002_Hikmawati	127_Rumiyati	
14.20	010_Dego YA	018_Elok	028_Nur Ida	041_Ernaway	031_Nurul H	021_Fatmawati	011_Ronnie SN	033_Hera Sisca	
14.30	024_Jhauratul	020_Rosalina	037_Nur Isti	054_Titin S	104_Nalle C	055_Aris D	014_Nera FR	070_Aliefman	
14.40	121_Dhony H	027_Rika HS	049_Nida EH	066_Taslim S	117_Sapriani	056_Susilawati	016_anggi	134_Murgayanti	
14.50	DISCUSSION	DISCUSSION	DISCUSSION	DISCUSSION	DISCUSSION	DISCUSSION	DISCUSSION	DISCUSSION	
15.00	GAP								
15.05-16.05	Room 1 SCIENCE Moderator: Dr. Rahadi W Notulen: Nunik	Room 2 HEALTH Moderator: Made Sriasih,Ph.D Notulen: Nanda	Room 3 SCIENCE (MIX) Moderator: Dr. Satrijo Saloko Notulen: Aluh	Room 6 ENGINEERING Moderator: Akmalludin, ST., Ph.D Notulen:Dewi	Room 7 SOCIAL HUMANIORA Moderator: Kamaludin Yusra, Ph.D Notulen: Guyub	Room 8 ENGINEERING Moderator: Sulaiman ND, Ph.D Notulen:Laili			
15.05	040_Siti Alaa	067_LR Telly S	130_Bambang HK	057_Suhayat	058_Rosalina	021_Fatmawati Amir			
15.15	043_Dhony H	074_Nurul F	114_Rauhul K	065_Husniatul K	073_IK Budastra	026_Made Sutha Y			

15.25	071_Aris D	080_Adriana E	133_Sukmawaty	069_Rahadi W	075_IGAK Chatur	128_Nurul F
15.35	072_Desi K	085_Yunita S	163_Indriyatno	125_Ramkani K	076_Tajidan	131_Nursiah C
15.45	132_Kansawi	093_Antari Al	032_Nurul H	126_Ramkani K	129_Muktasam	163_Buan Ansari
15.55	135_Budy Wiryono		112_W.Wangiana			166_IW Sudiarta
16.05	DISCUSSION	DISCUSSION	DISCUSSION	DISCUSSION	DISCUSSION	DISCUSSION
16.15-16.45	Afternoon Tea					
END OF DAY 2						

Day 3 : Friday, December 2 nd 2016								
08.00-09.00	Registration University of Mataram Dome (Prof Sunarpi Building) JL. Majapahit 62A Mataram				Organizing Committee			
08.00-09.30	Keynote Speaker Presentation 3			Moderator: Prof. I Komang Damar Jaya		Notulen: Dr. Aluh Nikmatullah		
08.00-08.45	Keynote Speaker-6 Functional and Halal Food			Prof. Amin Ismail University Putra Malaysia, Malaysia				
08.45-09.30	Keynote Speaker-7			Prof. Dr.Ing. Mitra Djamal , Bandung Institute of Technology, Indonesia				
09.30-10.00	Morning break Poster Session							
10.00-11.00	Parallel Session Prof. Sunarpi Scientific Lecture Hall University of Mataram Jalan Majapahit 62 Mataram Dome Level 1(Room 1); Level 2 (Room 2 to 8)							
10.00-11.00	Room 1 SCIENCE Moderator: Dr. Rahadii W Notulen: Aluh	Room 2 HEALTHY Moderator: Dr. Yunita Sabrina, Ph.D Notulen : Nanda	Room 3 AGRICULTURE Moderator: Dr. Satrijo S Notulen:Dewi	Room 4 AGRICULTURE Moderator: Dr.Bambang HK Notulen: Mursal	Room 5 SCIENCE Moderator: M. Sriasih, Ph.D Notulen: Guyub	Room 6 ENGINEERING Moderator: Akmaluddin,ST., Ph.D Notulen: Laili	Room 7 SOCIAL Moderator: Kamaludin Yusra., Ph.D Notulen: Irfan	Room 8 SCIENCE(MIX) Moderator: Sulaiman ND, Ph.D Notulen : Nunik
10.00	044_Dhony H	039_Ida Ayu EW	077_Sri Tejo W	105_Asep P	019-Nurul I	059_Aris D	022_Haryadi	045_Dian WK
10.10	124_Handa M	046_Made Darawati	081_Lolita ES	106_Liana S	050_Mala H	060_mustika	034_Sugeng H	078_Leli K
10.20	095_Merry W	047_Hamsu K	083_IKD Jaya	110_M Sarjan	053_Syamsul H	061_Syifa A	038_Dika S	115_B Azizah H
10.30	113_Laili M	048_Dian PS	084_IM Sudantha	111_Nihla F	068_Agustin	063_L Syamsul	042_Irmayani N	118_Ismail Y
10.40	030_Pispitahati	123_Chandra DH	089_IGM Kusnarta	112_W Wangiana	088_Aisah J	064_Annisa F	051_Saprizal H	082_Sri Tejo W
10.50	DISCUSSION	DISCUSSION	DISCUSSION	DISCUSSION	DISCUSSION	DISCUSSION	DISCUSSION	DISCUSSION
11.00	GAP							
11.10-11.40	CLOSING CEREMONY Location University of Mataram Dome (Prof Sunarpi Building),JL. Majapahit 62A Mataram				Ir. Aluh Nikmatullah, M.Agr.Sc., Ph.D. MC			
11.10-11.20	Presentation the Best Oral and Poster				Organizing Committee			
11.20-11.30	Conference Summary				The Chair 1 st ICST Dr. Ir. Satrijo Saloko., M.Si			
11.30-11.40	Closing Speech				Rector University of Mataram			
END OF DAY 3								
Day 4: December 3 rd , 2016								
08.00-18.00	FIELD TRIP							
END OF 1 st ICST								

PREFACE

Bismillaahirrahmaanirrahiim
Assalaamu'alaikum warahmatullaahi wabarakaatuh.

Praise always we pray to God Almighty for giving us the abundance of grace, guidance and inayah, so that we all can met in the “1stInternational Conference on Science and Technology (ICST) 2016”. ICST is a conference where researchers can share and publish their scientific papers about science and technology. The theme of this conference is “Emerging Innovation on Science and Technology for Sustainable Development”.

This conference was done for two days, from 1st to 2nd December 2016, and took place in the Green Campus of the University of Mataram.

We received more than one hundred papers from various universities and research institutions in Indonesia and from overseas, but not all of the papers were published in this proceeding. The paper has been selected and grouped based on the similarity of the research field, which then are presented and discussed. Presentation of the papers will be held in eight parallel classes.

At this moment, the organizing committee would like to expressour gratitude to all of you who have participated this conference, especially to the all keynote speakers, presenters who have submitted posters or orally presented papers and also to the participants. Our special gratitude also goes to the Rector of the University of Mataram who has been highly supporting this conference. Last but not least, the organizing committee would like to thank to all of you who have supported this conference.

Wassalamu'alaikum warohmatullahi wabarakatuh.

Chairman of 1st ICST 2016

Dr. Satrijo Saloko

The 1st International Conference on Sciences and Technology
December, 1-2, 2016 Mataram, Lombok-NTB, Indonesia

OPENING SPEECH - RECTOR THE UNIVERSITY OF MATARAM The 1st International Conference on Science and Technology 2016

Respected Guests,
Keynote speakers,
Conference participants,
and all other participants.

On Behalf of all staffs of the University of Mataram, I welcome you all to Lombok, a beautiful island in West Nusa Tenggara Province, where the University of Mataram is located. Lombok is known for its natural and cultural diversity where you can enjoy traditional cuisines, beaches, waterfalls, mountain, traditional villages and handicraft of many ethnics including Sasak, Samawa, Mbojo, Balinese, Chinese, Arabic, and many others.

As the Rector of the University of Mataram, it is a great honour for me to address the opening of “The 1st International Conference on Science and Technology” here at the University of Mataram, which will be held from 1th to 2nd December 2016, with a theme “Emerging Innovation on Science and Technology for Sustainable Development”. The main aim of this seminar is to gather scientist from all over the world to share their ideas, knowledge and experiences and to build network for possible future collaboration.

As we are aware that sharing knowledge and experiences from speakers are extremely valuable in a conference, therefore I would like to express my high appreciation, first, to the keynote speakers from overseas and from Indonesia for their willingness to come to Lombok to share their acknowledged works. Your effort and contribution to this conference are absolutely valuable. Second, my high appreciation also goes to the national speakers and all other participants, including the speakers from University of Mataram and local universities in West Nusa Tenggara Province, your participation in this conference not only will give incredible share of ideas, skills and knowledge that

The 1st International Conference on Sciences and Technology

December, 1-2, 2016 Mataram, Lombok-NTB, Indonesia

you have, but also will improve the academic environment that we are developing in this university. I hope this conference will be a good forum, not only for communicating and sharing ideas, knowledge and experiences, but also for building networking for future collaboration.

I would also like to take this opportunity to express my appreciation to the sponsors which have given some contribution to this conference. Last but not least, I would like to thank the organizing committee as well as all other supporters and participants, without their effort, commitment and hard work, this conference will not run well.

Finally, I wish you most successful conference, enjoy Lombok Island and hope to see you again in other forum here at the University of Mataram.

Rector of the University of Mataram

Prof. Ir. Sunarpi, Ph.D

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Shear Capacity Of Hybrid Coupling Beam

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Abstract

Coupled shear-wall structures are commonly applied for intermediate and high rise building to provide the withstand of lateral loading caused by an earthquake and wind loading. The failure mechanism of coupling beams affect the behaviour of coupled shear wall system because coupling beams are normally imposed to high shear stresses. The use of steel truss in coupling beam is considered as a new alternative method of coupling beam, solution to the problem for enhancing shear strength in coupling beam. The use of steel truss coupling beam encased in reinforced mortar can restrain the shear behaviour of coupling beam. This paper presents the analytical analysis shear design of various type of coupling beams including diagonal reinforced concrete coupling beam, steel truss coupling beam with and without buckling consideration and hybrid coupling beam that using steel truss encased in reinforced mortar. All type of coupling beams will be designed with the scale of 1:2.5 and span to depth ratio of model is 1.78 that requires for diagonal bars according to SNI 2847:2013 as the building code requirements for structural concrete under seismic design in Indonesia

Keywords: *coupled shear-wall, coupling beam, steel truss, reinforced mortar*

1. Introduction

SNI-2847:2013 Building Code Requirements for Structural Concrete [1] is the guideline for seismic design in Indonesia. This code requires the use of diagonal reinforcement for coupling beams having span-to-depth ratios lower than two. Moreover, The experimental test of [2] described that diagonal arrangement of reinforcement for coupling beam present sufficient resistance of shear strength for deep coupling beam with small span-to-depth ratios. Unfortunately, the applying diagonal reinforcement is difficult to construct on site. The utilizing steel truss reinforcement is considered as the alternatives method of coupling beam with encased in reinforced mortar for substituting the diagonal bars of coupling beam. This paper describes analytical analysis for various type of coupling beam using steel truss and encased mortar including diagonal reinforced concrete coupling beam.

2. Design of coupling beams

To asses the shear capacity of coupling beams, 10-stories building and span-to-depth ratio for coupling beam less than two for each level was chosen as a prototype coupled shear wall structure that adopted from [3] Assumed member sizes of structure are shown in Table 1 and 8th level was chosen as a model for experimental phase.

Table 1. Geometry and Shear forces of Prototype Structures of Coupled Shear wall [3] and [4]

No	Level	Width	Depth	Shear force (kN)		Material Properties
				[3]	[4]	
		(b)	(h)			
1	8	300	800	456	422.07	Beam reinf $\frac{f_y}{f_c} = 2$ 75 MPa
2	7	350	800	592	555.03	
3	6	350	800	644	609.57	Hoop/tie reinf $\frac{f_y}{f_c} = 2$ 75 MPa
4	5	350	800	676	647.37	Concrete $\frac{f_c}{f_c} = 1$ 30 MPa
5	4	350	800	669	643.16	(above level 3) $\frac{f_y}{f_c} = 2$ 25 MPa
6	3	350	800	592	550.56	
7	2	350	1500	908	1212.17	

The target shear capacity for all models of coupling beams are taken as 422.07 kN was adopted from previous researchers [4] as a prototype structures and all type of coupling beams will be created with the scale of 1:2.5. Design procedures for these models based on SNI 2847:2013 [1] and are basically based on a simple truss analogy for steel truss and hybrid coupling beam [4]. The dimension of coupling beams models is 120 mm x 225 mm with length of beam is 400 mm Span-to-depth ratio of models is 1.78 and V_u exceeding $0.33\sqrt{f'_c}A_{cw}$. The target of cylindrical compressive strength is 25 MPa.

3. Diagonal reinforced concrete coupling beam.

Shear capacity of diagonal reinforced concrete coupling beam is provided by concrete transversal and diagonal reinforcements contribution. This model can be shown in Fig.1

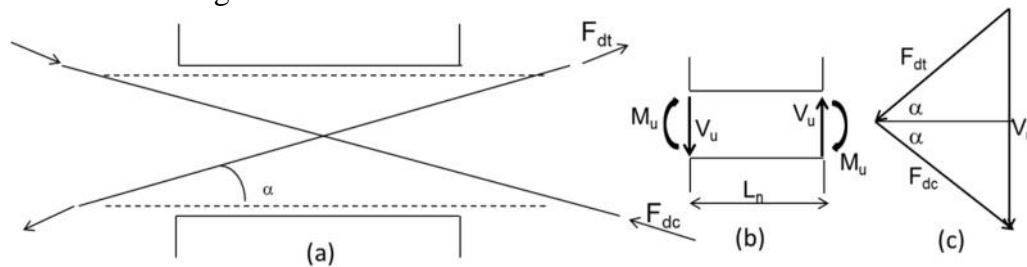


Fig.1. Model of diagonal coupling beam (a) configuration of diagonal bars

$$V_{total} = V_c + V_s + V_{diagonal} \quad (1)$$

Transversal bars shall be distributed along coupling beam with total area not less than $0.002b_w s$. So, the next step is to calculate the required area of diagonal bars according to Eq. 2. Each groups of diagonal bars have to comprise with four reinforcements.

$$V_n = 2A_{vd}f_y \sin r \leq 0.83\sqrt{f'_c}A_{cw} \quad (2)$$

where α is the angle between the diagonal reinforcement and longitudinal axis of coupling beam.

Diagonal bars should be encased by transverse reinforcement with outer dimension not less than $\frac{b_w}{2}$ in direction parallel with b_w and $\frac{b_w}{5}$ for other sides.

4. Steel truss coupling beam

The use of steel truss coupling beam is considered as an new alternative method of coupling beam, solution to the problem for enhancing shear strength in coupling beam. In this study, the steel truss coupling beams consist of double angle steel and angle steel profiles. The diagonal force component (F_d) and the shear resistance of steel truss can be obtained by Eq.3.

$$F_D = A_s f_y \text{ and } V_{steeltruss} = 2F_D \sin \tau \quad (3)$$

Model 3 can be defined as model 2 with buckling consideration design. In this model, diagonal and longitudinal members have to fulfill buckling requirement according to SNI 1729:2015 [5] as Specification for Structural Steel Building as the guideline in Indonesia that can be enclosed as Eq. 4 and Eq.5

$$\text{If } \frac{Kl}{r} \leq 4.71 \sqrt{\frac{E}{f_y}} \text{ or } \frac{f_y}{F_e} \leq 2.25 \text{ and } F_e = \frac{f^2 E}{\left(\frac{kL}{r}\right)^2} \text{ with } F_{cr} = \left[0.658 \frac{f_y}{F_e} \right] \quad (4)$$

and

$$\frac{Kl}{r} > 4.71 \sqrt{\frac{E}{f_y}} \text{ or } \frac{f_y}{F_e} > 2.25 \text{ with } F_{cr} = 0.877 F_e \quad (5)$$

The total capacity of diagonal members and shear capacity in model 3 is calculated by Eq.6

$$F_{D(model3)} = A_s F_{cr} \text{ and } V_{steeltruss} = 2F_{D(model3)} \sin \tau \quad (6)$$

5. Hybrid coupling beam

Hybrid coupling beam is model 4 that can be defined as steel truss coupling beam encased in reinforced mortar. The utilizing of encased reinforced mortar in steel truss is to prohibit premature buckling and enhance the shear capacity of coupling beam. The shear resistance of this model is provided by steel truss and reinforced mortar. The design procedural this model similar with steel truss coupling beam in model 2. Additionally, design of reinforced mortar can be designed as ordinary reinforced concrete beam. The total shear resistance provided by hybrid steel truss as model 4 is calculated by Eq. 7

$$V_{total} = V_{mortar} + V_s + V_{steeltruss} \quad (7)$$

The shear capacity and the geometric dimension of those type of coupling beams models are tabulated in Table 2 and Table 3.

Table 2. Shear capacity of various arrangement reinforcement of coupling beams

No	Type of coupling beams	Vc / Vmortar (kN)	Vs (kN)	Vd (kN)	Vtotal (kN)
1	Diagonal reinforcement	20.10	21.08	32.99	74.17
2	Steel truss without buckling consideration	-	-	68.23	68.23
3	Steel truss with buckling consideration	-	-	88.64	88.64
4	Hybrid steel truss	18.58	20.93	59.49	98.99

Table 3. Geometry dimension of design various type of coupling beam models

Diagonal reinforced coupling beam	Steel truss coupling beam without buckling consideration		Steel truss coupling beam with buckling consideration		Hybrid coupling beams			
	Horizontal Element	Diagonal Element	Horizontal Element	Diagonal Element	Horizontal Element	Diagonal Element	Reinforced mortar with f_c' mortar=30Mpa	
Diagonal bars	Double Angle Steel	Angle steel	Double Angle Steel	Angle steel	Double Angle Steel	Angle steel	Longitudinal Bars	Transversal Bars
4 ϕ 6	2L 30.30.3	L.30.3 0.3	2L35.3 5.3	L35.3 5.3	2L 30.30.3	L.30.3 0.3	2 ϕ 6	ϕ 6-200

Geometry sketch of test specimens and reinforcement details are shown in Fig. 2.

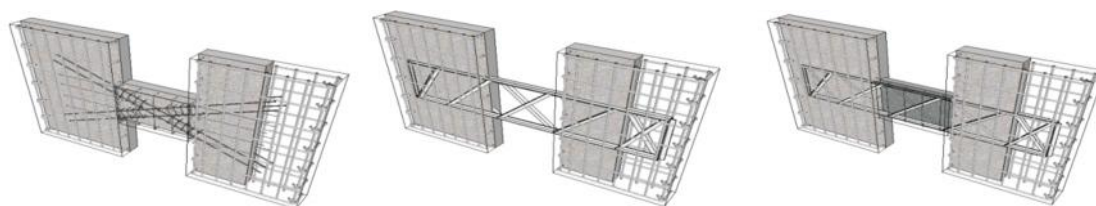


Fig.2 Geometry sketch of various type of coupling beams models (a) Model-1, (b) Model-2 & 3 and (c) Model-4

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