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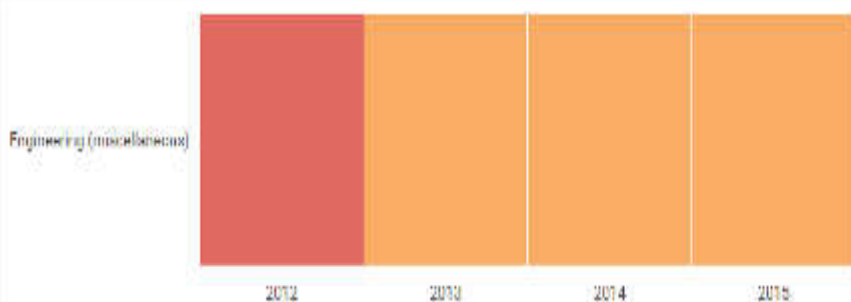
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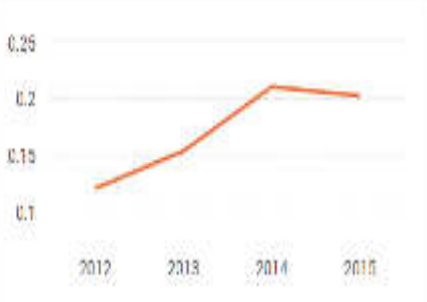
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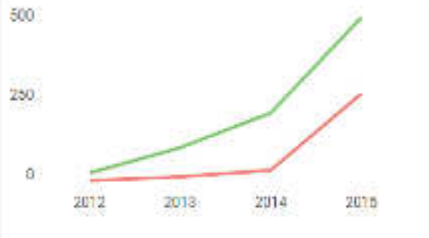
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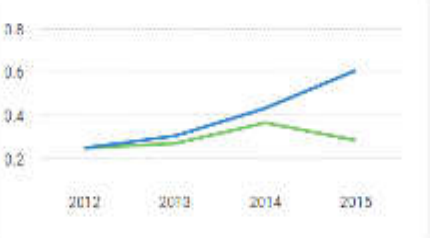
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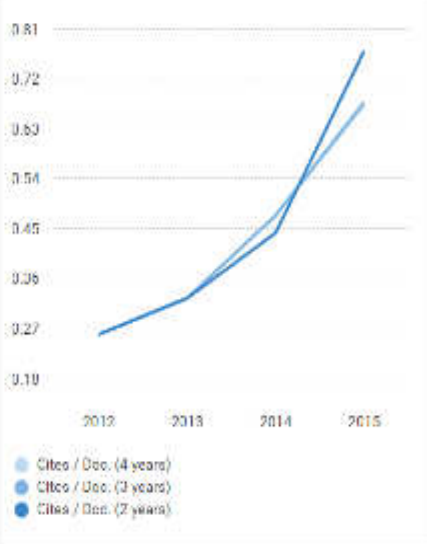
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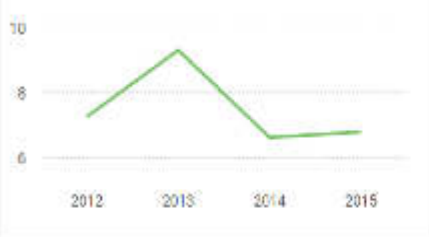
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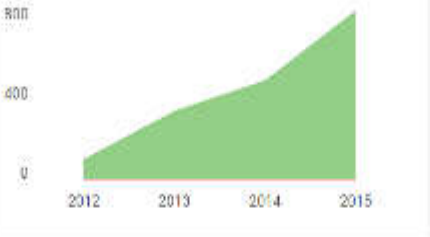
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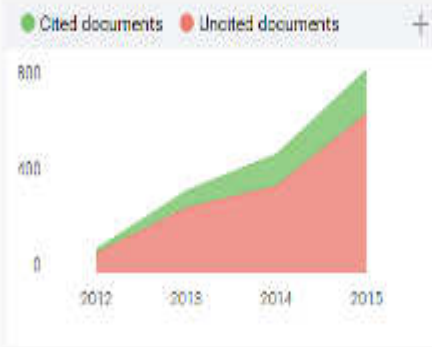


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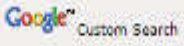


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Title: Design of low power reversible compressors using single electron transistor

Author (s): Amirthalakshmi T. M. and S. Selvakumaraja

Abstract: Most of the multiplier circuits used adders in order to reduce the vertical critical path of the partial products. But adders will create many problems like glitches, uneven signal transition, and it will take more number of steps to reduce the partial product reduction. To solve these problems, a special kind of adders that are capable to add four/six bits per decade. These adders are called compressors. The advantage of using compressors is to provide regular structure in reduction of partial product stage. The 4:2 and 6:2 compressors as processing elements (PEs) are the fundamental basic blocks for accumulating partial products during the multiplication process. In this paper, 4:2 and 6:2 compressors are designed on reversible logic using DKGP gate, one of the reversible gates and implemented in transistor level using Single electron transistor (SET). SET is considered to be popular in the field of nanoelectronics. It offers low power consumption and high operating speed. The developed compressors are simulated using SPICE software and the obtained results are compared with single electron transistor (SET) and the conventional CMOS. It is observed that the compressors using SET has considerable low power dissipation with conventional CMOS.

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Title: Exploring performance of TCP variants in wired and wireless networks

Author (s): Sagarika Pattnaik and Ajit Kumar Nayak

Abstract: In the current Internet with a high traffic load Transmission Control Protocol (TCP) is the key transport layer protocol. In spite of resource bottlenecks and largely unpredictable user access pattern, the TCP congestion control algorithm plays an important role to make the internet usable with successful transactions. There major implementations of TCP in use are Tahoe, Reno, New Reno and SACK. In this work, extensive simulations are performed to evaluate these TCP congestion control algorithms on different deployments to study various network parameters such as effective bandwidth utilization, fair resource allocation between different delay links. Analyses of the simulations are done and they go in the favor of TCP Sack in both wired and wireless environment. The variants show some amount of difference in their performance when they are compared in wired and wireless environment. The implementations suggest mechanism for determining when a segment should retransmit and how should the sender behave when it encounters congestion and what pattern of transmission it should follow to avoid congestion.

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Title: Investigating the dynamic performance of a wye-connected 18 coil section transformer model winding due to lightning voltage surges

Author (s): Javid Akhtar and Mohd. Zahed Ahmed Ansari

Abstract: A lightning voltage impulse is a very fast rising unidirectional transient overvoltage with magnitude of the order of several million volts and when gets in touch with the windings of a high voltage power transformer, the winding insulation will be overstressed and may get damage. This failure event incurs a heavy loss to the electric utility and is mainly responsible for transformer outages and thereby effecting the normal functioning of an electric power system. Hence a better knowledge of highly nonlinear electric stresses developed due to lightning impulses is necessary to safeguard the inner winding insulation of high voltage power transformers. In this paper, simulation analysis on a three phase wye-connected 18 coil section transformer model winding is being carried out to examine its dynamic behaviour under the influence of a standard lightning impulse and chopped impulse voltages.

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Title: Castella composite beam testing to be used as a structural element of multistorey buildings in eastern Indonesian region

Author (s): Mara Junus

Abstract: The purpose of this study was to determine the flexure capacity, resistance, ductility, energy absorption and stiffness of the castella composite beam to be used as a structural element of the multi-storey building frame. This research was carried out through testing castellan composite beams in the form of a portal with cyclic loading. Solid beams steel used is profiles IWF 200 100 5,5 8 fabricated became castella beam. Test beam consists of a solid beam (NB) as a comparison and Castella beams with concrete filler between the flange namely castella composite beams (CCB). The results showed that based on flexure capacity, resistance, ductility which meets the ductility requirements of SNI -1726-2002, energy absorption, and stiffness degradation shows behavior similar to the solid steel beams, then the beam CCB can be used as a structural element in multi-storey buildings for earthquake zone IV, V and VI or Eastern Indonesia Region.

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Title: Automated recognition system for facial expression based on the fusion of spatial and frequency domain features

Author (s): R. Suresh and S. Audithan

Abstract: The development of facial expression recognition system proliferates now-a-days due to its various fields of application such as Human Computer Interaction (HCI), behavioral studies, facial nerve grading in medicine, automated tutoring system, synthetic face animation, and robotics. Among the various behavioral traits such as voice and gaits, facial expression is the most and effectual communicative way of humans. It is also a natural, non-verbal and non-intrusive communicative source. In this study, multidirectional approach based robust and automated facial expression recognition system is proposed. Contourlet transform is adopted as multi resolution and multi directional approach for feature computation along with Discriminative Robust Local Ternary Pattern (DRLTP) and Gray Level Co-occurrence Matrix (GLCM). On account of classification K-Nearest Neighbor (KNN) classifier is used based on city block distance measure. The standard Japanese Female Facial Expression (JAFFE) database is utilized to evaluate the performance of the proposed algorithm. Experimental result shows that the proposed system achieves satisfactory performance of over 91%.

[Full Text](#)

Title: Effects of degree of ripeness, moisture content and temperature on thermal conductivity of apantu variety of plantain

Author (s): J.K.Afriyie, A.Bart-Plange and E.Asiedu

Abstract: The effects of degree of ripeness, moisture content and temperature on the thermal conductivity of both ripe and



CASTELLA COMPOSITE BEAM TESTING TO BE USED AS A STRUCTURAL ELEMENT OF MULTISTOREY BUILDINGS IN EASTERN INDONESIAN REGION

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ABSTRACT

The purpose of this study was to determine the flexure capacity, resistance, ductility, energy absorption and stiffness of the castella composite beam to be used as a structural element of the multy-storey building frame. This research was carried out through testing castellan composite beams in the form of a portal with cyclic loading. Solid beams steel used is profiles IWF 200 100 5.5 8 fabricated became castella beam. Test beam consists of a solid beam (NB) as a comparison and Castella beams with concrete filler between the flange namely castella composite beams (CCB). The results showed that based on flexure capacity, resistance, ductility which meets the ductility requirements of SNI -1726-2002, energy absorption, and stiffness degradation shows behavior similar to the solid steel beams, then the beam CCB can be used as a structural element in multi-storey buildings for earthquake zone IV, V and VI or Eastern Indonesia Region.

Keywords: steel, castella, composite, cyclic load.

1. INTRODUCTION

Eastern Indonesia Region such as Papua is prone to strong earthquakes, besides that material for the construction of multi-storey buildings to be imported from other regions in Indonesia, thus requiring highest construction costs compared to other regions in Indonesia. The use of steel material is more advantageous in many respects, especially the ability to resist earthquake loads compared to reinforced concrete material. Most of the building structure with steel material uses solid steel profiles as advantageous solution in terms of strength and material usage. Experts are trying to structure how to increase the strength of steel elements without an increase in self-weight of steel in order to obtain some new methods that beams with openings entity known as castella beam. One form of the body opening is hexagon shape. Research on this openings has been done by Wakchaure MR, Sagade AV, Auti V. (2012) and the results showed that the openings with 0.6 of the beam height is the possible maximum openings, or in other words the maximum eligible beam height of the castella beam that can be fabricated. Research on the angle and length of exposure to a high of 0.60 to a high aperture solid beam has been carried out by Parung Herman *et al* (2013) are given monotonic load. Solid steel profiles fabricated into castella beam is IWF 200 100 5.5 8. Research results show the opening angle of 60° and aperture length $e = 3b = 9$ cm gives the best result of the angle and length of openings for openings hexagon. The purpose of this study was to determine the behavior of the castella composite beams through frame structure testing in the laboratory that allows it to be used as a structural element beam on frame of multi-storey building

2. RESEARCH METHODS

2.1 Testing principle

The principle of the test is based on the structure of the framework that burdened earthquake load as in Fig. 1a by taking part beams and columns that are restricted to the joint (s) Figure-1b. Due to horizontal load, the moment at mid beam and column values will be close to zero. Therefore, the position of the zero moment can be modeled as HINGED, column and beam sections tested are considered to represent part with the end as a HINGE (the moment = ZERO).

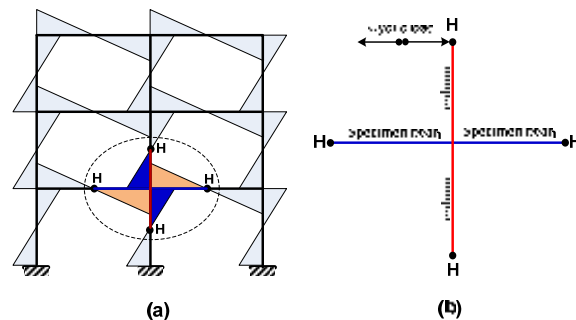


Figure-1. (a) The moment area of a frame due to earthquake loads, (b) Principle of the test beam-column element.

2.2 Test beams

Specimens, a steel beam used is a profile IWF 200 x 100 x 8 x 5.5 with hexagon shaped openings. High



aperture 0.6 H, a distance of 9 cm and the aperture opening angle 60°. The cross section of the test beam as in Figure-2. Yield stress (f_y) of steel used is 240 MPa

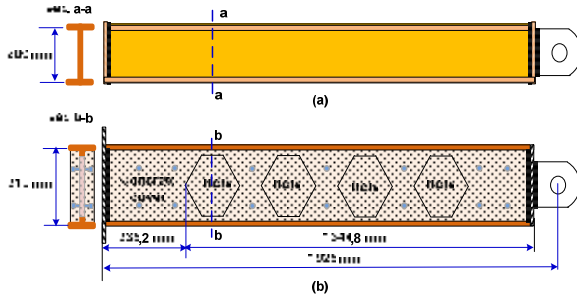
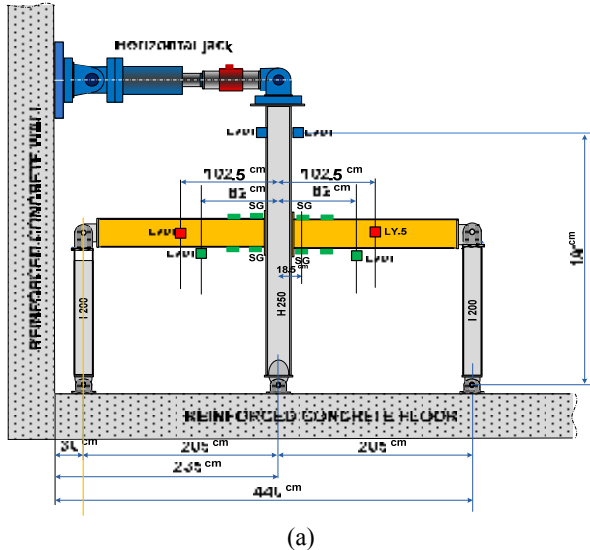


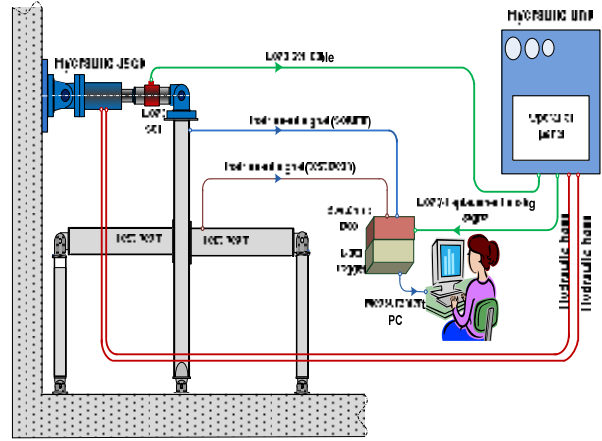
Figure-2. Beam test for the: (a) normal beam (NB), (b) castellan composite beam (CCB).

2.3. Testing frame

The testing requires testing framework. Testing framework is designed based on the principle of test as in Figure-1. Steel beams used are H 250 250 9 14 for the middle column and the IWF 200 100 5.5 8 for the other columns Figure-3. Testing framework laid out on the floor and walls of reinforced concrete. Equipment and testing instruments required are: crane, strain gauge FLK 2.12, LVDT (Linear Variable Displacement Transducer) with a precision of 0.005 and 0.01, actuator (horizontal jack) with a capacity of 1200 KN, logger data and switching box.



(a)

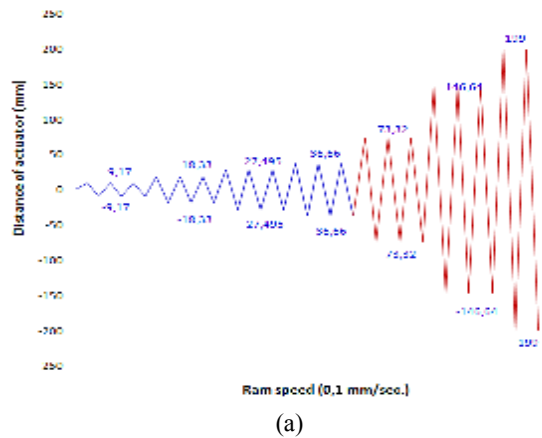


(b)

Figure-3. (a) Framework for testing and placement of testing instruments, (b) testing installation.

2.4. Testing implementation

The cyclic loading is given in the form of displacement-controlled at the upper end of the column. Method of loading each cycle based on the Recommended Testing Procedure for Assessing the Behavior of Structural Elements under Cyclic Loads issued by the European Convention for Constructional Steelwork (ECCS). The testing stopped when loading cycles plans reached $P_{failure} = 0.80 P_{max}$. (Recommendation by ASTM international, designation: E 2126-02a year 2002). Displacement load-ram speed relationship that has been done as shown in Figure-4. Documentation pictures of the testing are presented in Figure-5



(a)



Table-3. Resistance ratio of the test beam.

Test beam	P _y (KN)		P _{max} (KN)		Resistance (ε)	
	(+)	(-)	(+)	(-)	(+)	(-)
NB	25.02	25.1	29.66	29.45	1.19	1.17
CCB	70	68.45	84.50	85.00	1.21	1.24

Based on the deviation between P_{design} with P_{actual} and resistance, the behaviors of the two beams are almost equal in receiving loading.

3.3 Ductility

The Load-displacement curve relationship (P-Δ) of the test beams NB and CCB are shown in Figure-6. This curve shows the yield load, yield displacement and ultimate displacement of the beam test. Based on the curve's shape of the beam test showed a similar behavior in relationship between load (P) and displacement (Δ)

Table-4 list of full ductility from yield condition to final load. At the ultimate load (P_{failure} = 0.80 P_{max.}), full ductility (μ) of NB and CCB test beam respectively 11.89 and 8.8. These data indicate full ductility of CCB test beam smaller 25, 99 % compared with test beam NB. This is caused by the increased rigidity of the beam due to the addition height of the beams and concrete between the flanges of the CCB beam so that minimize displacement value.

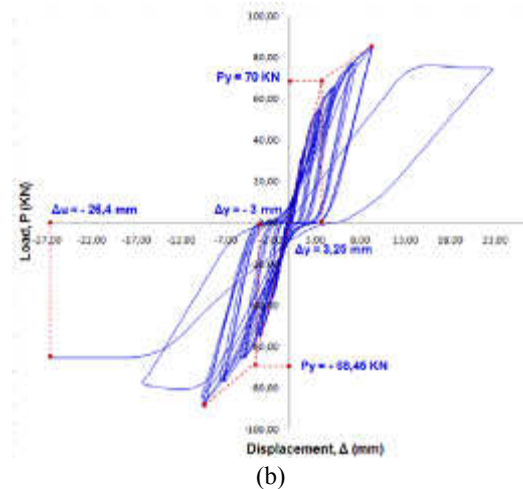


Figure-6. The load-displacement curve relationship (P-Δ) for, (a) NB test beam, (b) CB test beam.

Table-4. Full ductility of test beam.

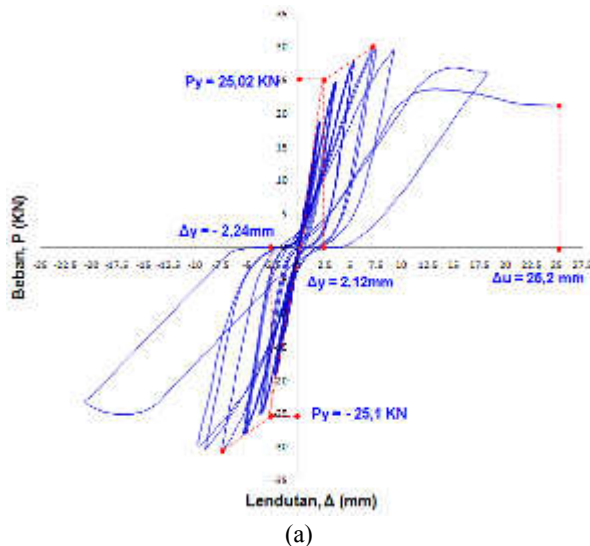
Test beam	Yield disp. (Δ _y) (mm)	Ultimit disp. (Δ _u) (mm)	Ductility μ = Δ _u /Δ _y
NB	2.12	25.2	11.89
CCB	3	26.2	8.8

Table-5 below shows the performance level of the building structure according to SNI-1726-2002

Table-5. The performance level of the building structure.

The performance level of the building structure	Ductility (μ)	R
Partial ductility	1.5	2.4
	2.0	3.2
	2.5	4.8
	3.0	4.8
	3.5	5.8
	4.0	6.4
	4.5	7.2
5.0	8.0	
Full ductility	5.3	8.5

Source: SNI-1726-2002





Full ductility in the SNI-1726-2002 Table is planning requirements of earthquake-resistant buildings in a powerful earthquake zone (zone 6) such as of eastern Indonesia region.

Table-4, data for full ductility (μ) is 8.8 of the CCB beam is larger than the full ductility (μ) is 5.3 in Table-5. This data shows, CCB beams can be used as a structural element for multistorey building frame.

3.4. Energy

Table-6, the list of energy absorption (P- Δ) for the test beams at yielding and maximum conditions. At

the yielding conditions, the absorption energy of each test beam at the positive moment and negative moment the energy absorption of CCB test beam increased respectively by 108.6% and 92.23% or an average 105.4% when compared with NB test beam. At the maximum conditions, absorption energy for the beam test on the positive moment and negative moment: the energy absorption of CCB test beam increased respectively by 253.2% and 181% or an average 217.1% when compared to the NB test beam. This energy absorption value differences caused by the increased of an inertia moment on the CCB beam.

Table-6. Energy absorption of the test beam.

Test beam	Energy (Joule)			
	Yield		Max.	
	(+)	(-)	(+)	(-)
NB	1,069.20	1,096.92	5,141.55	6,112.83
CCB	2,230.82	2,108.63	18,158.34	17,176.87

3.5. Stiffness

Value of the stiffness degradation ratio (ξ) on the ultimate load for the test beam as shown in Table-7.

Table-7. Stiffness degradation ratio.

Test beam	Stiffness degradation ratio (ξ) = $\frac{t_g \alpha_u}{t_g \alpha_y}$
NB	0,30
CCB	0,32

From the data in Table-5 shows that; stiffness degradation ratio (ξ) of beams NB test beam over 2% faster than the CCB test beam. The difference is not very significant value but this condition shows the behavior of the two beams in stiffness is almost equal

4. CONCLUSIONS

From the discussion above, a number of conclusions as follows:

- Fabrication normal beam into castella composite beams can save steel material by 50.23% so efficiently used as a structural element.
- Behavior of the CCB beam in terms of flexural capacity, resistance, energy absorption and stiffness degradation is almost the same as the normal beams behavior.
- Full ductility value of the CCB beam eligible in accordance with SNI -1726-2002 on Earthquake Planning Procedures for Building Resilience in Indonesia.

- Based on the conclusions 1, 2 and 3 show the CCB beams can be used as a structural element beam on a multistorey building frame on the strong earthquake region.

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