INSTRUCTIONS FOR PREPARAING CAMERA-READY MANUSCRIPTS

1 INTRODUCTION

These instructions explain how a manuscript should be prepared to be published in the EASEC-7 proceedings. They are laid out exactly as we want the papers in the book to appear. By following them carefully you will help to produce an attractive book which is a permanent record of the event of which we can all be proud.

2 GUIDELINES FOR THE TEXT

The text must be printed on A4 (210 mm x 297 mm) sheets, single-spaced, with line lengths of 160mm and a height of 250mm (top margin of 25mm, bottom 22mm and left and right margin of 25mm). Use Times Roman typeface 11 pt. The length of the manuscript is restricted to 6 pages. Manuscripts exceeding 6 pages will not be accepted. Please make sure that your paper corresponds to the accepted abstract and that it is well organized.

Your paper should be prepared in English and, if you are not fluent in English, checked by a professional for language quality. In submitting the paper, you affirm that the material it presents is original and unpublished.

3 TEXT FORMAT

- (1) The title should be in capital letters, bold and centered on the first page beginning on the 6^{th} line of the sheet.
- (2) Allow two blank lines between the title and the author's full name. The first author should be the speaker. The last name of each author should be typed in capitals.
- (3) Use superscript ^{1, 2}, .. for the author's current affiliation which is then referred to as footnote at the bottom of the first page.
- (4) Allow one blank line between the text and the solid line from which the footnote starts, as follows:
 - ¹ Dept. of Infrastructure Structure Systems Engineering, Kochi University of Technology, Japan, DR
 - ² Dept. of Civil Engineering, National University of Singapore, Singapore, Ph.D.
 - ³ School of Civil Engineering, Asian Institute of Technology, Thailand, ME
 - ⁴ Research Laboratory, Kajima Corporation, Japan

Use Times 10 pt for the footnote and make sure that the footnote remains within the margin.

- (5) An abstract of not more than 12 lines shall be given at three lines below the author's name.
- (6) Keywords of not more than 2 lines shall be given in alphabetical order below the abstract with one blank line.
- (7) Allow two blank lines between the keywords and the top heading.
- (8) In the text, first and secondary level headings shall be in capitals and numbered. Only first level headings should be in bold. Only the first letter of the third level heading is capitalized. All headings being at the left-hard margin. INTRODUCTION and CONCLUSIONS should be numbered. ACKNOWLEDGEMENT and REFERENCES are not numbered and must be centered. Leave a 2-line space above the first level headings and a 1-line space below. Allow a 1-line space above and below each subheading. An example of headings is given below:

1. INTRODUCTION

•••••

3. RESULTS AND CONSIDERATION

3.1 PROPERTIES OF SLAG CEMENT

(1) Properties of hardened concrete

5. CONCLUSIONS

- (9) Allow double space between paragraphs. All paragraphs start at the left-hard margin.
- (10) References should be indicated in the text by consecutive numbers in brackets, as follows:

Experimental studies have indicated general trend [1], but further

(11) All references should appear together at the end of the paper. The full references are cited in a numbered list of the of the following styles:

(a) In the case of journals,

[1] Yang, S. and Makizumi, T., "Control of cracking in concrete due to drying shrinkage by using grid-type continuous fiber reinforcement," *Memoirs of the Faculty of Engineering*, Kyushu University, Japan, **55**(4), 1995, pp. 421-441.

Note: 55 is Vol. No. and (4) is Series No.

(b) In the case of books,

- [2] Paulay, T. and Priestley, M.J.N., "Seismic design of reinforced concrete and masonry buildings," John Willey & Sons Inc., 1992, pp. 122-148.
- (12) Authors are allowed to use such abbreviations of academic societies as ACI, AIJ, ASCE, ASTM, C&CA, CEB, EASEC, FIP, IABSE, ISO, JCI, JSCE, PCA, RILEM, WCEE and other well recognized abbreviations of academic societies not covered in this list.
- (13) The page number and the first author's name should be written with light pencil in the upper right corner on the back of each sheet.

4 FIGURES, TABLES AND PHOTOGRAPHS

Figures and Tables must be originals, placed on the page with captions, where they are intended to appear in the text. Both illustrations and lettering must be large enough to be legible when reduced to approximately 9/10 when published. Captions of figures and photographs should appear below them and captions of tables are typed above. They should be positioned in the text leaving two lines of space above and below. Putting text beside illustrations is not recommended but allowable. Authors should make sure that sufficient space is provided between the illustrations and the text on the side.

Photographs should be in black and white prints. Do not paste photographs on to the manuscripts. Instead write down the author's name, photo number and reduction rate at the back of each photo. Put

these photos in a small envelope and send it together with your manuscript. If you are sending more than one manuscript in the same envelope, write down your paper title on the envelope containing the photos to avoid getting mixed up.

5 EQUATIONS

All equations are included in the text and numbered as (1), (2) ..., etc. The number of the equation should appear in the right-hand margin. In the text, equations are referred to as Eq.1 and so on. Allow 1 line spacing above and below equations.

6 SYSTEM OF UNITS

The International System of Units (SI) is recommended.

7 SUBMISSION

An original plus a copy of your manuscript should be received by EASEC-7 Secretariat before 1 March 1999. A registration fee of JPY 10,000 should accompany each manuscript. No manuscript shall be printed without receipt of the registration fee and no refund will be made unless your paper is rejected.

Registration form and the payment method will be made available on the web site as well as in printed form in early February.

8 IMPORTANT NOTICE

Please note that EASEC conferences are organized to provide opportunities for researchers to present their findings and exchange ideas and information among their peers. It is therefore expected that papers published in the proceedings be presented at the conference. If you or any of your co-authors are unlikely to attend the conference to make the presentation, please do not submit your paper. However if after submission you realize that neither you nor your co-author will be able to attend, please inform the Secretariat so that we can arrange for the proceedings to be sent to you after the conference. Under this circumstance you will be responsible for the shipping cost.

No proceedings will be mailed to participants who fail to inform the Secretariat in advance that they will not be able to attend the conference.

ELASTOPLASTIC BEHAVIOR OF HYBRID R/C COLUMNS WITH CFRP GRIDS

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ABSTRACT: A total of nine columns were tested under cyclic lateral load while simultaneously subjected to constant axial load, in which general deformed steel was adopted as longitudinal reinforcement. Herein five specimens were hybrid columns contained CFRP grids as hoops, and four standard specimens were reinforced by steel hoops and designed as flexural failures. Test variables studied in this research program were axial load and hoops spacing. As an experimental result, a little degradation of lateral force capacity and accumulated energy absorption capacity was observed in the columns confined by CFRP grids in contrast with steel hooped columns. When spacing CFRP grids closer vertically, the hybrid columns exhibited the same elastoplastic behavior as steel hooped columns.

KEYWORDS: axial load, bond cracking, CFRP grids, confinement, cyclic lateral load, ductility, elastoplastic behavior, flexural strength, hybrid column, shear strength

1 INTRODUCTION

Corrosion of steel reinforcement embedded in concrete by chloride ions has been found to be a significant factor in the deterioration of concrete structures. For many well-known advantages, Continuous Fiber Reinforcement Plastic (CFRP) reinforcing material has been introduced as reinforcement to inhibit or eliminate corrosion for concrete structures subjected to corrosive conditions or where electrical/electromagnetic insulation is required [1].

This paper compared R/C columns confined by CFRP grids to the ones confined by steel hoops on elastoplastic behavior, while general steel bars were adopted as longitudinal reinforcement. The purpose of the paper is to discuss the influence of confining effect on seismic behavior of the hybrid R/C columns with CFRP grids.

In this experiment, about 10mm long protuberances remained to avoid tensile fracture at lattice joints, which stuck out from lattice joints and were embedded by cover concrete. The crossed strips of CFRP grids spaced at 70mm interval forming nine small squares.

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(Sample page)

3. SHRINKAGE AND CREEP MODELING

3.1 DATA GENERATION

(1) Shrinkage strain

For drying commencing at time t_0 , the mean shrinkage stain in the cross-section at time t is given by

$$\varepsilon_{\rm sh}(t, t_0) = \varepsilon_{\rm sh\infty} k_{\rm h} S(t, t_0) \tag{1}$$

.....

(2) Properties of reinforcing materials

The mechanical properties of reinforcing materials are shown in Table 1.

Table 1	Mechanical	properties	of reinforcing	materials
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Reinforcement	$A_{\rm sh}({\rm cm}^2)$	$f_{\rm y}({\rm Mpa})$	$\epsilon_{y}(\%)$	$E_{\rm s}({\rm GPa})$
CFRP strip	0.310	179	1.77	101
Steel bar(D6)	0.317	398	0.20	196
Steel bar(D10)	0.713	409	0.20	203

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6. CONCLUSION

- (1) Columns transversely confined by CFRP grids performed slightly lower behavior than the ones with confining steel on
- (2) Due to protuberances

ACKNOWLEDGEMENT

The authors acknowledge

REFERENCES

- [1] Fujisaki, T., Sekijima, K., Matsuzaki, Y. and Okamura, H., "New material for reinforced concrete in place of reinforcing steel bars," *IABSE Symposium, Paris-Versailles 1987*, IABSE, 1987, pp. 413-418.
- [2] Mander, J.B., Priestley, M.J.N. and Park, R., "Theoretical stress-strain model for confined concrete," *ASCE Journal of Structural Engineering*, **144**(8), 1988, pp.1804-1826.