LONDON

For "Tall Buildings"

For Plate Girder Colloquium.

May 22 - 28, 1971

237. 73
Trip to London

**HIGHLIGHTS**

22 Mar
EN ROUTE TO JFK: The pollution over Manhattan (well known in it) ... Smooth ride in this little Beechcraft 99. At JFK the first-class lounge was open to us ... I've got to find a way to join their clipper club.

EN ROUTE LONDON: 747 only 25% full ... First trans-Atlantic flight on which I didn't think they fed us enough. Room gave when I arrived ... No matter, one available down the street.

23 Mar
CHANGING THE GUARD AT BUCKINGHAM PALACE ... Stumbled on it by chance ... was just out for a walk, really, and there were the Horse Guards parading by.

TALL BUILDING PRELIMINARY MEETING:
It appears as though 15 will be there including 3 chairman or vice-chairman of technical committees.

Tea was good.

HILTON HOTEL is nearby ... I rather not stay at one because of their 'snobbery'. But they always have a good place to eat.

SHUFFLE THE PAPERS this morning, getting ready for this afternoon's session.

RECEPTION BY BRITISH STEEL CORPORATION:
... One of those that one can shots before the toast to the Queen ... will responses from Bacon, Marshall, and Beadle. (at least they could have told me there would be a response)

SECOND DAY ... AND SUMMARIZE
We read the whole Queen's report. We held an executive meeting this morning. We are making our decisions ... seems to be usual for these affairs ... a 'first time' for me.

"WHEN WE ARE MARRIED" D.J.B.

"Princess play at the Strand. A good production ... saw it with former Fritz letter. Frol Yanwe.

CAMBRIDGE CREW BROAD OXFORD AND ... not by just a little bit. It was a weakness - for "row away"?

LONDON TOUR: Subway ... Royal Opera Hall ... Charing Cross ... Trafalgar Square ... Piccadilly ... Regent Street.

ST. PAUL'S ON SUNDAY ... At 8.00 am to have a small service of Communion. But the great domed church is empty. Beautiful in its silence and grandeur of this great creation.

24 Mar
REVIEW OF TALL BUILDING PROBLEMS:
This was the highlight of the afternoon ... group entered into the discussion well ... slides seems to get a peak reception at the start, but it picked up later.

25 Mar
FIRST DAY OF GIRDLE CONGRESS:
Wielded the gavel for the first session ... of the 30 people attending, they came from 9 countries ... and 5 the Kelham PhD's.
22 MAR

En route JFK

0745
4 of us on this little Monmouth plane.

The pollution over Manhattan is something terrible!
Now this little plane, flying fairly low over the V-Narrows bridge, one can scarcely see the World Trade Center.
We are going to suffocate in our own sulfur.

1030
This 747 is at best 25% full. How can they wake anything at this rate?

Washington Hotel

23 MAR

0020
They sold my room. I guess neither PAA, nor my seat informed them of my late arrival.
Oh, well, Pembroke hotel, down Half Moon Place will do as well. And at $100 a night, who will complain.

1030
To the Washington theatre for a walk on this rainy day.

Say, this is a good day. A few minutes walk and I see the Changing of the Guard at Buckingham Palace.
But see what a Constitutional Walk brought me!
Lots of tourists, but not nearly as many as in the regular season.
Preliminary discussions for the London Week.

Godfrey - Shifteco - Beech

Oldroyd, Sta. - Bate, Mansford, Mitchell, Eaton

Redhill, Armytage, Arch, Needham

CTICM - Shifteco

Cambridge - Heywood, Oppenheim

Aston - Majid

Sr. Will Res. Sta. - Gurney

ETH/IAEIC - Dumas

Hejlik - Beadle, Ostopenko

Cornado - Godfrey

Torrer, Eng. - Tyrrell

Bowen (??) Eng - Bowen

367-3

23 March 71

Eric Bryan, Univ. of Salford, Salford, M54 4WT (061) 736-9643

Prof. of Short. Engin.

333

Sad copy of 333 reports to G. Godfrey & Shifteco. Can we have a correspond member?

&

G sends kind regards and pls change his address

4

Stratton, Stud at LV

X V - Attended the week on March 24, 1971
LONDON MEETING: Tall Buildings

369-3
24 Mar 71

Institute of Civil Engineers G Great St.

A Upgrade: see separate letter

Context of report

What about current research? [only on a not-to-delay basis]

Emphasis that we have regular opportunities
to report on current research.

What are the problems?

Girders: comparison of loading surveys in various countries

Blyth Research Station

HMSO

[There are the only three that Mitchell knows of.]

Survey

Is fatigue really a problem in tall buildings? [cited low-cycle fatigue in wind loads]


Girders carry left elevator equipment

Concrete

Recently wind tunnel at full-scale observations. A critical study a need

24 full-scale buildings (including the one special Hong Kong building) are known to be under study.

Masonry

How does one design for an "accidental" load? Like London fit. Are there other such accidental loads?

How to make it safe for its occupants

To what extent do developers control final design?

Shouldn't there be developers on committees?
Majid
What are the definition constraints

Rafe
How can we introduce limit state design into practice?

CIB W23 deformation of floors - has some rules
200' 15" out of plumb (Edw. problem)

Visible lean - How much can be permitted.

Is vibration of cladding not really the problem?

What in the

Ach

Ted

Ned no sooner written for his committee [I gave him a copy of the list in Room 20]

TB: why it cannot be built with "from the street" when write now of construction

Needham

Sorry: how to take into account the stiffening effect of the cladding

How to quantify this matter

How to keep ourselves up-dated with new development. Some countries are
(The Japanese are always up to date) very ahead of others.

What is the basis of equitable international design competition when there
is no code?

How to further disseminate the fact that this work is so on.

And

S44-10

And

And
Areas of unserviceability after a few years of use
Broken door, chimney, windows, etc.

How can we integrate the safety into the structure?

DSF.

The chimney problem, (see above)

Wind: How are the wind loads arrived at? (Same basis / probably of site)

One cannot compare wind load codes because observations are

made in a different way.

Importance of Committee 1:

How does the way of living influence design? Some people, for example, need to be
closer to windows. Such buildings might tend to the warmer, perhaps, than for us.

Need bemo on plan & design committee.

K. I. MAJID COMMITTEES:

1. Structural system (3)
2. Wind
3. Stability
4. Ultimate strength design.
Committee 5  S.A. Report

Galley suggests: Mitchell 4P, Actual Floor Loads (from p.8, 16 Nov 70)

T. Mueller  VÖEST Stahlbau
Postfach 2  LINZ/Donau, Austria
"Dead Load: Live Loads"

[Signature: 5]

Committee 17

Russin: He's an EA! Dubas will present his material.

Lorin: OK to make a substitute

Oppenheim: Also an EA. OK to make substitute

(W.J.?)

Committee 15  S.A. Report

T. cream

(Abbreviations and signatures)

- Braced Frames: M. R. Horve
- Unbraced: Heyman
- Stability & Stress Lubs: Vogel
- Shear Walls & P.O.
- Column: Deni: Popov
- Optima: Deni
- Sun: GCO
London meeting concentrated on "facing questions"

An invitation from Mr. A. Goldstone (Institute) to the national group's representative and guests at the institution of civil engineering on March 24th in connection with the joint committee planing and design of Tall Buildings. The group represents developers, builders, and contractors.

Following a brief review by the chairman, H.S. Beadle (C-terminal), and comments by the vice chairman, O. Shulze (C-terminal, Paris), the meeting concentrated on the discussion of:

1. What are the problems? What are the topics which are important in design but for which satisfactory answers are either unknown or not complete?

Among the comments reviewed, the following stood out as of special importance to the group assembled:

- How can one make a tall building better serve its occupants — and the city, of which it is a part? How does the "image of time" influence design? Can some countries' rules need to be closer to windows and net?
- What are acceptable vibration limits? Of the structure? Of the cladding?
- How can the "stiffening" effect of cladding be quantified? 
- In some parts of the world, there is intense competition, but there is no common specification or standard. How can a suitable base be established for such competition? Strategies?
- How can one better integrate the cladding into the structure?
- Designing to resist areas of unserviceability (not their own design, such as broken stone and broken windows, after shattering short life).
- How can we correlate design loads in different countries? Equal load does not mean equivalent safety. This is especially true with wind.
Even though the first target of the joint committee is in the preparation for the international conference to be held at Belgrade in 1972, (August 24-29), the delibration of such problems as the above cited are useful in assessing priorities for further research. Also they should be helpful to State of Art Report—just now beij appointed.

This meeting followed after the "First Regional Conference" held in Paris, France, Jan 21-22, 1971. The proceedings of the meeting, which pinpointed on the scope of the work of the various committee, are available from Belgrade University.

The next major regional meet is scheduled for May 18-19 in Belgrade, Yugoslavia. Contact may be made with the conference chairman, Prof. M. Marcus, University of Belgrade, Belgrade, Yugoslavia.
ANNOUNCEMENTS

INTRODUCTIONS Name, institution, how they got started

I. ULTIMATE STIFFNESS

Fujii: Tests do not agree with his mechanism - especially with Pehlke's

From point of view of designer, want to simplify. Thinks his model is both

A: His method he likes.

How does Fujii's method apply to ungrouted?

Requires computer.

K: Which figure to use? Comes up about log shift.

B: Suggest a combination of Fujii, Pehlke, Korenke, Olteanu.

Rockey

Unstiffened (Cresfield)

M: What

Importance of labor cost.

C: What about manual shifting? They are cheaper.

B: They want no shifting.

NEWSLETTER See sheet in IA G FILE
### Research Needs

<table>
<thead>
<tr>
<th>Question</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>How to proportion a gusset plate?</td>
<td>USA, AISC, API</td>
</tr>
<tr>
<td>Must the gusset plate remain stayed?</td>
<td>USA, AASHTO</td>
</tr>
<tr>
<td>What is the effective width to be used with gusset plates on the webs of girders on the webs of girders?</td>
<td>Czech</td>
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<tr>
<td>What F.S. should be used for compressed flange of box girders?</td>
<td>** Belgium **</td>
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<tr>
<td>A substitute for ( x ) is needed</td>
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<tr>
<td>Hybrid: How to support flanges on these lower strength material in webs</td>
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<tr>
<td>Box Girders: Interaction between compression flange buckling and compressed web buckling</td>
<td></td>
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<tr>
<td>Dependence on lateral support of web compression</td>
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<tr>
<td>Torsional action</td>
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</tbody>
</table>

**Proposed**

**To be proposed**
II Combined shear & Bending

[MAEDA] Darfere: Has measured compressive stresses considerably above for this finite element method.

AO: What is the boundary condition of flange?

Skaland: How can tension and compression stresses be equal?

[MAEDA] Test results can be explained on basis of the buckling of flange result. Neglects 4. V. Torsion: Includes bending and moment.

AO: What if we had frictional ability?

[MAEDA] Cooper: Long interferences are not to add to I, but to keep the web flat. By where should one shift from one to two long interferences?

CAG: Does anyone have data on effectiveness of a less-than-adequate long?

AO: Rules of Fig. 17 of 328.10

Discussion: Devises stiffener by 5 and uses Kloppel tables.

Plint: Is there a departure from plane strain?

Cooper: Skaland: Optimize the whole girder.

Optimum panel vs optimum girder

Meer: Can we calculate I? 

Plint: Look out for explosive border

Cooper: Might only reach My

Gedde: Unless fall buddy pataki way in which case, read My

[MAEDA]
Session II (cont'd)

Poerner: Present a model to account for shear & bending

Flint: Centroid for yield

Pocket: Tensile diagonal width varies across depth of girder. Yields at one point at junction of flanges.

anstapenko

He will send us an addl report (WTC Bulletin)
A trouble: how does one find how a part reaches its strength?

Use a stretch-string diagonal

Refers to paper by Yoshida's method of corresponding initial yield

Massi: Good to see that S^2 works

Bergf: Is the 44.6's compared with shaft stiff area to flange and web

Massi: As in talk about analysis. Bergf: about design


Also at ASME-CEC session

Ozias: Long stiff was installed because deflections would otherwise lead to fatigue

Corpor: Shaft to control def. ... but of need, how to include the stiffener

Ozias: Deformations occurred after concreting

Komatsu: The membrane action pulls the long stiffener up (if I grasp it in his report)

Flint: What about the bit of the floor held up?

Pocket: Vertical stiffener carries it. Need more research
<table>
<thead>
<tr>
<th>Date</th>
<th>Notes</th>
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<tbody>
<tr>
<td>05-Mar-71</td>
<td>Mark Gordon confirms. p5</td>
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<td></td>
<td><strong>Rodney:</strong> (re. AoIs) What is the difference?</td>
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<td>Thinks it's the angle of diagonal. Whether flange is i5 or s5.</td>
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<td>How is it anchored?</td>
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<td><strong>Arzumyan:</strong> What about discreteness of strain?</td>
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<td><strong>Rodney:</strong> Web distribution is an approximation.</td>
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<td><strong>Clark:</strong> Measure principal stresses?</td>
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<td><strong>Arzumyan:</strong> Some agree with Ao-cho, fence with R-S.</td>
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<td><strong>Boben: What one take into account for the players?</strong></td>
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<td>Concerned that it violates the lower bound theories.</td>
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<td><strong>Skeldon:</strong> Yes. Observed 230% increase in strength. [I can search]</td>
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<td>[believing this]</td>
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<td><strong>Höglund:</strong> Can we tolerate the shear deflections?</td>
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<td><strong>Boben:</strong> Watch collapse.</td>
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<td></td>
<td>(R)</td>
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<td></td>
<td><strong>Arzumyan:</strong> What are the linear deflections?</td>
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<td><strong>1980:</strong> RECEPTION AT HOTEL —— BY British Steel Corporation</td>
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<td>Dr. Henderson (Scottish origins) on host.</td>
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<td>A fine voice, toast to the Queen — and to all world leaders.</td>
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<td></td>
<td>After which they ceased smoking — not before.</td>
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<td></td>
<td>Rody's reminiscences — and toast to those from overseas.</td>
</tr>
<tr>
<td></td>
<td>In response Really? Do the Japanese who have come the fattest?</td>
</tr>
</tbody>
</table>
Session III

FUKUDA

Measure residual stresses
Mass:
F: specs for box girder?
Residual: F: steel seems to increase bulk
A0: The traction curve reallly does account well for G
UB: first observation of G F. AT LU: Box Girder

HAGLUND

Holes
Mass:
Today: has solved this problem -- with reinforcement design included
A0: Refer to work of Bauer & Redwood
UB: what about work of Kusuda & Thurston (LU 848)

DUBAS

Box Girder

Buckling of entire panel of box girder with limit deflection of flat bars

MAISONNET

3 collapses from Nov 69 June 70 Oct 70

(Australia) (Wales) (Melbourne)

Reserve is less in box than in web of pl girder

Austria case: 1st. run 2nd 3rd

Melbourne:

For excit: Fs = 1.25

Errors, temperature, etc. led to Fs = 1.0 → Failure

<table>
<thead>
<tr>
<th>$H/H_a$</th>
<th>$S/S_a$</th>
<th>1.43</th>
<th>2.86</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1.118</td>
<td>1.118</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1.057</td>
<td>1.057</td>
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<tr>
<td>2</td>
<td>1.006</td>
<td>1.006</td>
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</table>
28 MAR 71  LONDON TO U.S. (Philadelphia)

0845  What terrible coffee. I must have been the first one in the hotel to order it.

0920  St. Paul's  Alas, no bells, but what a peaceful place so early in the morning. Practically deserted.

The man is opening the gate, donning a capet... "Do the bells ring now?"

"I never knew"

"Is the first service at 8:00 o'clock?"

"Sorry, I only open up the place"

PRESIDENT NIXON has decided to establish wage and price controls to fight inflation in America. His first use of the powers is expected to come next week, when he issues an executive order establishing a network of labour-management boards to control wages throughout the construction industry.

L. Ron, Times

It was nice to walk about in the early morning.

The views of this masterpiece of Sir Christopher Wren, shortly after the Great Fire of 1666.

Apologies: deserted, too, except for those attending the communion service.

Afterwards: The solitude, absolute solitude, under the great dome.

It appears as though they've got serious structural problems.

One can see the inward lean of the great columns that support the dome.

No wonder there's a major campaign on to "SAVE ST PAUL'S!"

And the damage done to the stone by air pollution is a fright.

0945  Breakfast will commence.

0945  To the Airport via MA, Trafalgar St Station.

A picturesque ride, for a bit, along the Thames. It was fun to see the Cambridge-Oxford do.

The paper called it a man-race, although they apparently made the 2nd best time in history.

Made the plane by ten minutes and that by jogging down the walkway.

The body check was a real first.

1230  Take off

1425  Lunch

0820  Departure to HCL

1100  Lunch

1230  Snack

To the Plane. A 707, chicken dinner.

A man got sick, a lady "fell out" and had to be cared for in first class. Another fellow seems to be drunk.
26 Mar 71

Wish Ao and Dal Tanna;

A full night's sleep... the first one on this trip.

27 Mar 71

9.00
Review with Ao / Massonet / Hockey of the Survey Report.
I hope I didn't push them too fast.

12.30
Italian Lunch.

14.00
Cambridge - Oxford Boat Race
Cab to Hammersmith Bridge.
En route we pass the busses taking the Cambridge crew to their boat.
I think we went to the wrong side of the river.
Good for pictures... but only the briefest view of the Cambridge.
I hear they won by 10 lengths!

Tea (at the planet place)
Underground to Charing Cross, hence to bridge (from view of St. Paul's Cathedral).
No good program tonight at Royal Festival Hall... so forget it.
Shopping... but nothing open... I mean, it's tight.

17.00
Late dinner with Massonet at the Hilton.

Well, if I pack up tonight, then if I wake early I can get to St. Paul's and hear the bells... like in '49.

2310:30
Session IV: Summary

Proceedings Volume

Closing date for M/S April 30, 1971 to submit camera-ready copy
According to IABSE rules, 16pp inclusive. Typing 
Prepared Discussion

Submit camera-ready by April 30, 1971. As per original length. Non-submitted papers should be sent to all participants.

Free Discussion:

Tape-recorded. Transcribed. Will send to participants to review prior to printing.

Review of Summary Paper

0.1 Edict

Transversely-Stiffened Girders

Truss-Stiffened Girders

Treat under each heading

[APA: LSB: Separate § for lengthy]

1 (1) Add AASHTO, delete Swiss.

Several countries are on the verge of revised:

Belgium

It can be used now in France & in Switzerland.

1 (2) 4 (Skaland) ... and attached to flexible flange

1.1 (1) More elaborate and sophisticated

1.1 (x) Ostermunko-Chern to be added

1.1 (x) Add theoretical contribution of Cushion

See balance on notes written on the Summary report draft
Discussion, Topic III

Cooper: Sketch of overall cross-section. Interaction of web, comp. fig.

Rockey: Describes his data.

Matt: Introduction of hyperbolic functions.

Ao: "Mini-tube" Torsion (box-girders).

Ao: Stiffened Plate studies. Tech by aircraft shipbld.

Clark: Box-Girders: column analysis.

Fukunaga, 1958. Studies Naval Arch.

"On the Ultimate of Steel: Airship to Conquer Land, 1958"


"On the Quality of Reinforced Thin-Shell Lame of H.T. Steel

Under Compression." Ibid.
Skaland: The concept should be abandoned.

Cooper: Why won't the effective width concept work?

Clark: What about the effective length?

**LEONTARD's Communication**

- Bottom flange: There is negligible post-buckling.
- Consider flexibility of knee brace stiffeners (effective pty. mass).
- Consider an eccentricity.
- Consider inclination of force due to shear.
- Consider rigidity of stiffeners.

**Küppel**

Box girders

Refer to p. 14415 of his book.

Formula (which cannot be demonstrated):

\[ \frac{V_b^k}{V_0} = 1 + 2\alpha \frac{2\beta}{a} \]

- \( V_b^k \): col. buckling
- \( V_0 \): pl. buckling
- \( \alpha = \frac{a}{b} \)
- \( \beta = \frac{L}{2} \)

**MECDA**

Hybrid: In hybrid girders, the d/W is reduced from 1400 to 300.

Applications of his 328 report.

**BERGSELT**

Core loads: Unstiffened girders with loads such as those that are applied as foot piers, etc.

- Cycle: 80% no effect
- 90% = over effect

**AO**

Tests by Forrest & Mach. ASCE (Sr.): We slot side

Tests on uniform-dist load

Ult. load = multiple of bucky load.

**Skaland**