

August 25, 1994
G-1151-RSO-94-365

Document Control Desk
United States Nuclear Regulatory Commission
Washington, D.C. 20555

BOEING

Reference: a) Boeing Letter G-1151-RSO-92-365 dated August 31, 1992;
R. S. Orr to the NRC Operations Center
b) NRC Letter Docket No. 99901227 dated August 12, 1992; L. J. Norrholm to R. S. Orr; Subject: Response to 10 CFR 21 Inquiry

Dear Sir or Madam:

In accordance with the reference correspondence and 10 CFR 21, Boeing is sending the NRC the attached error notice(s) received from our former software suppliers. Because of unknown current addresses, the following former customers were not notified:

Reactor Controls, Inc.

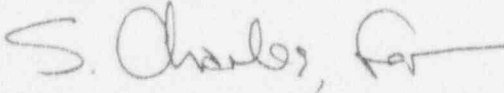
Echo Energy Consultants, Inc.

Nuclear Applications and Systems Analysis Company (Japan)

Nuclear Power Services

Error notices have been sent to our other former customers.

Very truly yours,



R. S. Orr
Nuclear Administrator
G-1151 M/S 7A-33
(206) 865-6248

Attachment(s): GTICES Program Report Forms Nos. 94.12 and 94.13

300064

JE09

August 18, 1994

I S

AUG 25 1994
CONTRACTS

Attention: Nuclear Administrator
Boeing Computer Services
P.O.Box 24346, M/S 7A-33
Seattle, Washington 98124-0346

RE: GT STRUDL

Dear Sir or Madam:

Enclosed please find copies of the GTICES PROGRAM REPORT FORMS Nos. 94.12, 94.13, and a VENDOR ACKNOWLEDGEMENT FORM. Please sign and return the VENDOR ACKNOWLEDGEMENT FORM to acknowledge receipt of the GTICES Program Reports.

Thank you for reviewing the Program Reports and for returning the Acknowledgement Form.

Best regards,
CASE Center



Catherine Lee
Configuration Control Manager

CL/apw
Enclosures

GTISL Program Report Form

GPRF No.: 94.12

DATE: Aug 17, 1994

FROM: GTICES SYSTEMS LABORATORY
GEORGIA INSTITUTE OF TECHNOLOGY
ATLANTA, GEORGIA 30332-0355

SEVERITY LEVEL:

- ☐ URGENT Problem results in incorrect answers which may not be apparent or job aborts and cannot be recovered within the session or job.
- ☐ SERIOUS Problem results in incorrect answers which are obvious or problem prevents completion of a particular user's task.
- ☐ MINOR Problem can be worked around or problem poses high frustration factor.
- ☒ INFORMATIVE Documentation error, program usage tip, user inconveniences.

DATE PROBLEM CONFIRMED August 16, 1994

DATE NOTIFICATION SENT August 19, 1994

COMPUTERS All

OPERATING SYSTEM All

GTISL BASIC SYSTEM VERSION All

GTISL PRODUCT NAME GTSTRUDL

VERSION All versions prior to and including 9401 RS

TARGET RELEASE FOR CORRECTION 9402

GTISL Program Report Form
(Continued)

GPRF No.: 94.12

DATE: Aug 17, 1994


DESCRIPTION:

Typographical errors were found in section 3.2 "Dynamic Verification Problem #2" and section 4.3 "Nonlinear Verification Problem #2" of the GTSTRUDL Verification Manual. The corrections are shown on the attached pages.

The equation in section 3.2 was stated incorrectly, and some of the constants on the illustration pages were incorrectly stated.

The dimensions for the figure in section 4.3, and some of the constants were incorrectly stated.

Please see the attached pages for corrections and replace them with the appropriate pages in the GTSTRUDL Verification Manual.



Signature
Software R&D Division

Configuration Control Manager

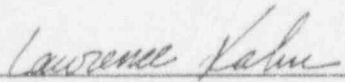
Title

CATHERINE LEE

Typed or Printed Name

Aug 17, 1994

Date of Signature



Signature
Professional Services Division

Director Professional Services

Title

Lawrence Kahn

Typed or Printed Name

8 Aug 94

Date of Signature

3.2 Dynamics Verification Problem #2

In this problem (Figure 3.2) a free vibration analysis was performed on a massless planar beam with a single lumped mass at one end. The lumped mass experiences only an x-direction translation degree-of-freedom (i.e., z-rotation and y-translation degrees-of-freedom are prevented). The vibration of the beam resulted from an initial displacement of 0.5 in and an initial velocity of 10 in/sec applied at the beam's only degree-of-freedom. Damping was assumed to be 5% of the critical level.

The exact solution of the equation of motion is as follows,

$$x(t) = e^{-\xi\omega t} [x_0 \cos(\omega_D t) + (v_0 + x_0\xi\omega)/\omega_D \sin(\omega_D t)]^*$$

where

$x(t)$ = x-direction displacement

ξ = damping ratio

ω = natural circular frequency (rad/sec)

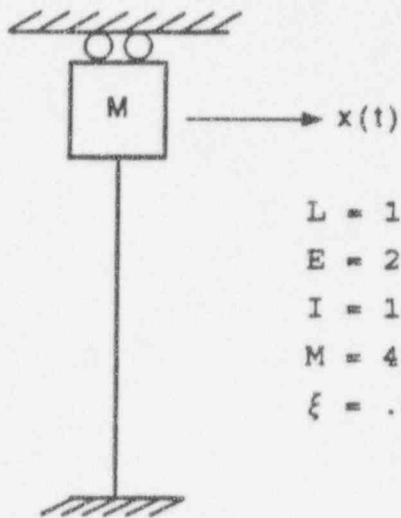
ω_D = damped natural circular frequency

x_0 = initial displacement

v_0 = initial velocity

t = time

*Paz, Mario, Structural Dynamics Theory and Computation, Van Nostrand Reinhold Company, 1980, Page 26, Equation 2.20.



$$\begin{aligned} L &= 10 \text{ in} \\ E &= 2000 \text{ lb/in}^2 \\ I &= 100 \text{ in}^4 \\ M &= 40 \text{ lb} - \text{sec}^2/\text{in} \\ \xi &= .05 \end{aligned}$$

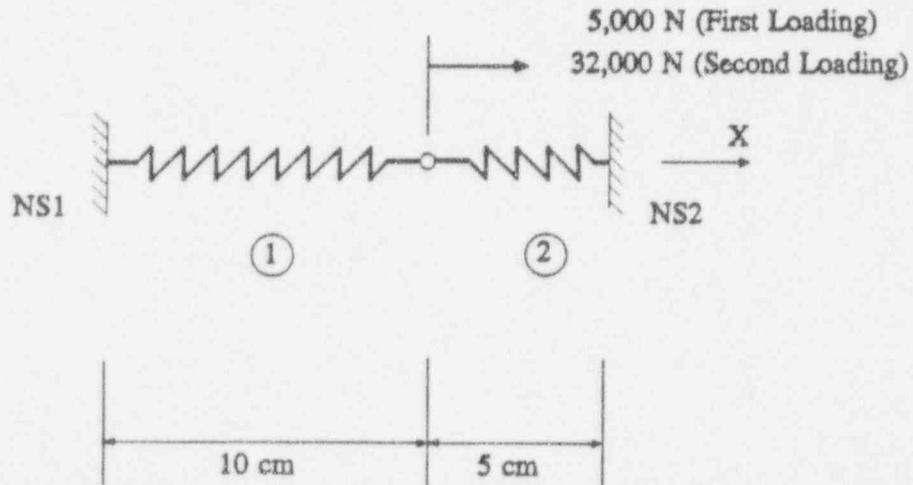
$$\begin{aligned} \text{Transverse Stiffness, } K &= 12EI/L^3 \\ K &= 2400 \text{ lb/in} \\ \omega^2 &= K/M \\ \omega^2 &= 60 \text{ (rad/sec)}^2 \\ \omega &= 7.7460 \text{ rad/sec} \end{aligned}$$

$$\begin{aligned} \text{Damping Constant, } C &= 2 \cdot \xi \cdot \omega \cdot M \\ C &= 30.98386677 \text{ lb sec/in} \end{aligned}$$

Figure 3.2 Illustration of Dynamics Verification Problem #2

Nonlinear Verification Problem #3 -

Nonlinear Spring Element



Properties:

Springs 1 and 2
 $AX = 1 \text{ cm}^2$,
 $E = 10,000,000 \text{ n/cm}^2$,
 $E_T = 100,000 \text{ n/cm}^2$

Reference:

Finite Element Procedures in Engineering Analysis,
by Klaus-Jurgen Bathe
Prentice-Hall, Inc., 1982,
Example 6.1, Pages 305-307.

Figure 4.3 Nonlinear Verification Problem #3 -- Nonlinear Spring Element

GTISL Program Report Form

GPRF No.: 94.13

DATE: Aug 17, 1994

FROM: GTICES SYSTEMS LABORATORY
GEORGIA INSTITUTE OF TECHNOLOGY
ATLANTA, GEORGIA 30332-0355

SEVERITY LEVEL:

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DATE PROBLEM CONFIRMED August 17, 1994

DATE NOTIFICATION SENT August 19, 1994

COMPUTERS VAX, HP, IBM RS6000

OPERATING SYSTEM All

GTISL BASIC SYSTEM VERSION All

GTISL PRODUCT NAME GTSTRUDL

VERSION 9301 VAX, 9401 HP, 9401 RS

TARGET RELEASE FOR CORRECTION 9401PC

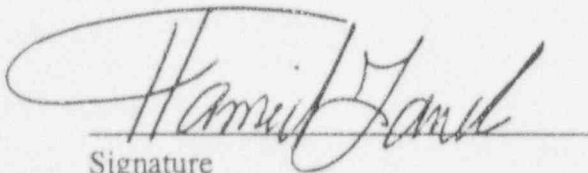
GTISL Program Report Form
(Continued)

GPRF No.: 94.13

DATE: Aug 17, 1994

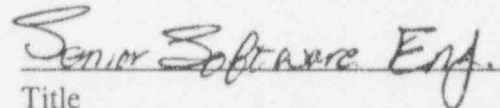
DESCRIPTION:

See attached sheets entitled: STEEL DESIGN

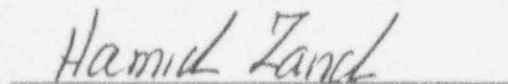


Signature

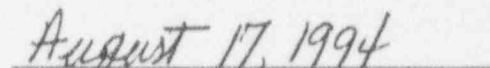
Software R&D Division




Title



Typed or Printed Name

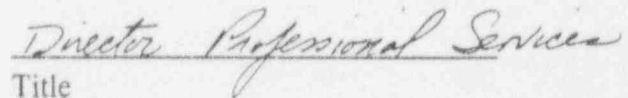


Date of Signature

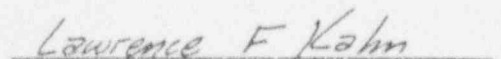


Signature

Professional Services Division



Title



Typed or Printed Name



Date of Signature

GTISL (GTICES) PROGRAM REPORT FORM
(continued)

Date: Aug-17-1994

Description:

STEEL DESIGN

Positive Z-axis bending for members with Tee cross-sections using the ASD9 code may result in incorrect actual/allowable ratios for the AISC Ninth Edition Equations F1-6, F1-7, and F1-8 when the structure contains members which have different cross-sections (W shapes, Tees, etc.). The incorrect computation of actual/allowable ratios for the Equations F1-6, F1-7, and F1-8 may result in a premature failure of the member (when CHECK is used) or an over designed cross-section (when SELECT is used).

Example:

Members 1 to 5, 8, and 9 are W shapes (or other than Tee shape), members 6, 7, 10 are Tees.

- a. SELECT MEMBERS 1 TO 10

Members 6, 7, and 10 (Tee shape members) may be over designed.

- b. CHECK MEMBERS 1 TO 10

Results for the members 6, 7, and 10 (Tee shape members) may be indicated incorrectly as failed members.

Workaround:

Use 78AISC code for the Tee shapes.

- a. PARAMETER
 'CODE' 'ASD9' ALL
 \$
 SELECT MEMBERS 1 TO 5, 8, 9
 SELECT MEMBERS 6, 7, 10 USE CODE '78AISC'

GTISL (GTICES) PROGRAM REPORT FORM

(continued)

Date: Aug-17-1994

- b. PARAMETERS
 'CODE' 'ASD9' ALL
 'CODE' '78AISC' MEMBERS 6, 7, 10
 \$
 SELECT MEMBERS 1 TO 10
- c. PARAMETER
 'CODE' 'ASD9' ALL
 \$
 CHECK MEMBERS 1 TO 5, 8, 9
 CHECK MEMBERS 6, 7, 10 USE CODE '78AISC'
- d. PARAMETERS
 'CODE' 'ASD9' ALL
 'CODE' '78AISC' MEMBERS 6, 7, 10
 \$
 CHECK MEMBERS 1 TO 10

Applicable GTSTRUDL User's Manual Sections:

1. ASD9 Code Parameters -- Table ASD9, Volume 2A.
2. ASD9 Code -- Section ASD9.0, Volume 2A.
3. ASD9 Provisions for Tees -- Section ASD9.3.5, Volume 2A.