January 30, 2006
9704-PFS-138

DOCUMENT CONTROL DESK
UNITED STATES NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

BOEING

Subject: GT STRUDL Program Report Forms 2004.08 & 2006.01 – 2006.05

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
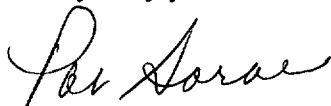
Dear Sir or Madam:

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

> Reactor Controls, Inc
> Echo Energy Consultants
> Nuclear Applications and Systems Analysis Company (Japan)
> Nuclear Power Services
> GPU Nuclear Corporation
> Tenera, Inc.
> Stone & Webster Engineering
> Raytheor Engineers & Constructors
> Gilbert Associates, Inc.

Error notices have been sent to our other former customers.

Very truly yours,

Pat Soroe
Nuclear Administrator
(425) 865-1043
patricia.f.soroe@boeing.com

Enclosures: GT STRUDL Program Report Forms 2004.08 & 2006.01 – 2006.05

IE19

GTSTRUDL Program Report Form

SEVERITY LEVEL:

X 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.
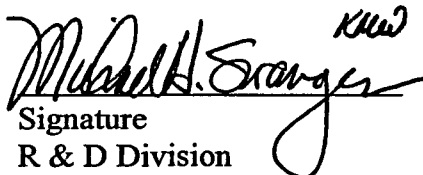
Date Problem Confirmed __November 3, 2005__

Date Notification Sent ___11/4/05___
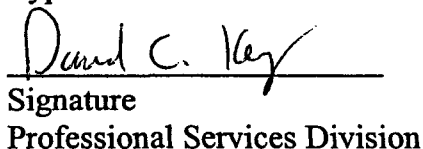
Computers _PC_

Operating System_All_

Version _All_

Target Release for Correction   Version 29.0

_____   ·Sr. RE
Signature   Title
R & D Division

__Michael H. Swanger__   __11/3/05__
Typed or Printed Name   Date of Signature

_____   Configuration Control Manager
Signature   Title
Professional Services Division

__David C Key__   __11/4/05__
Typed or Printed Name   Date of Signature

Rev. 2.5

GTSTRUDL Program Report Form
(Continued)

DESCRIPTION:

Section 2.4.7, GTSTRUDL Reference Manual Volume 3 states that there are six types of pseudo static loading conditions that can be computed as follows:

(1)   Previously computed results of a specified modal combination type of a particular response spectra loading condition are copied into a static loading condition.

(2)   Previously computed results at a specified point in time of a particular time history loading condition are copied into a static loading condition. This represents a "snapshot" of the structure's response at some point in time.

(3)   *A static loading condition is created by performing a square root of the sum of squares calculation over a specified modal combination type (i.e. RMS, CQC, or TPM, etc.) which had been previously computed in two or more response spectra loading conditions.*

(4)   Previously computed results of a specified mode of a particular response spectra loading are copied into a static loading.

(5)   The response associated with a particular forcing frequency associated with a harmonic loading condition is copied into a static loading condition.

(6)   The maximum absolute value of response over time (time history loads) or over forcing frequency (harmonic loads) is copied into a static loading condition.

Although Item (3) (in italics) is the only type of pseudo static loading for which the SSRS calculation over two or more existing dynamic (response spectrum) loadings is explicitly stated as being supported, the SSRS calculation is computed correctly for the pseudo static loading types described in Items (1), (2), (4), (5), and (6) as well if appropriate multiple dynamic loadings are specified. For example, the command

CREATE PSEUDO STATIC LOAD FROM MAX OF LOADS 1 2 3

computes the correct SSRS of the time-history maximum responses over loadings 1, 2, and 3 if loadings 1, 2, and 3 are transient loadings for which transient analysis results exist; however, this type of SSRS pseudo static loading calculation is not explicitly supported.

The problem described by this GPRF occurs when member section forces are computed for SSRS pseudo static loadings. Such member section forces computed from a

SSRS pseudo static loading condition are correct only for the type described in Item (3). The section forces computed from SSRS pseudo static loadings of the types described in Items (1), (2), (4), (5), and (6) are incorrect. This error situation applies to all areas that rely on the computation of member section forces including: list internal member results, steel member code checking and design, reinforced concrete member design, and GTMENU and scope environment graphical display of member force and moment diagrams.

GTSTRUDL Reference Manual Sections

Pseudo Static Loading Creation Command   Section 2.4.7, Volume 3,
                                                         GTStrudl Reference Manual

GTSTRUDL Program Report Form

GPRF No.: __2006.1__

DATE: __1/4/2006__

FROM: Computer-Aided Structural Engineering Center
Georgia Institute of Technology
Atlanta, Georgia 30332-0355

SEVERITY LEVEL:

X 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
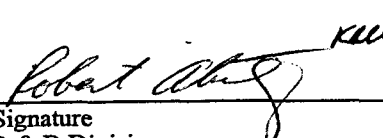Documentation error, program usage tip, user inconveniences.

Date Problem Confirmed __1/4/2006__

Date Notification Sent __1/6/06__
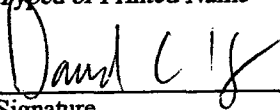
Computers __All__

Operating System __All__

Version __28.1 and earlier__

_____ _____
Signature   Developer
R & D Division   Title

Robert Abernathy
Typed or Printed Name

_____
Signature
Professional Services Division

David C. Lee
Typed or Printed Name

1/4/2006
Date of Signature

Configuration Control Manager
Title

1/6/06
Date of Signature

Rev. 2.5

GTSTRUDL Program Report Form
(Continued)

Description:

When a GIRDER is PROPORTIONED, the 2nd and subsequent analysis members in the girder may be rotated 90 or 180 degrees. The first member of the girder is unaffected. This rotation is performed during an analysis command, CONSISTENCY CHECK or when GTMenu is entered. The rotation can be observed by using the PRINT MEMBER CONSTANTS command, displaying the member local axis in GTMenu or by selecting Redraw Solid in GTMenu.

This problem only affects girders that lie parallel to a global axis.

Workaround:

Re-specify BETA for members in the girder, with the current MATERIAL type being MATERIAL REINFORCED CONCRETE. For example, for a girder 'G1' that lies parallel to a global axis:

```
MATERIAL REINFORCED CONCRETE  $ Not needed if RC is the current material type
PROPORTION GIRDER 'G1' GIVEN B 18. H 24. WITH DETAIL
$ + any more PROPORTION commands for other girders

$ Force the possibly incorrect BETA calculation with CONSISTENCY CHECK
$ Then correct the BETA angles
CONSISTENCY CHECK

$ A "PRINT MEMBER CONSTANTS" command will show if any members are rotated

CONSTANTS
  BETA 0.0 MEMBERS GRP 'G1' $ Replace "0.0" with correct value if needed
  $ + any more girders that may need correcting
```

GTSTRUDL Program Report Form

SEVERITY LEVEL:

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_ MINOR   Problem can be worked around or problem poses high frustration factor.

_ INFORMATIVE   Documentation error, program usage tip, user inconveniences.

Date Problem Confirmed __1/4/2006__

Date Notification Sent __1/6/06__

Computers __All__

Operating System __All__

Version __28.1 2 earlier__

_____ Kew
Signature
R & D Division

_____Developer_____
Title

__Robert Abernathy__
Typed or Printed Name

_____
Signature
Professional Services Division

__1/4/2006__
Date of Signature

__Configuration Control Manager__
Title

__David C. Ke__
Typed or Printed Name

__1/6/06__
Date of Signature

Rev. 2.5

GTSTRUDL Program Report Form
(Continued)

Description:

If any TABLE type MEMBER PROPERTIES are referenced in a Reinforced Concrete job, and the DETAIL command or the WITH DETAIL option for PROPORTION is used, a subsequent SAVE will fail. The design commands do not have to reference the TABLE property members to trigger the problem. PRISMATIC type member properties (specifying AX, AY, etc.) or MEMBER DIMENSIONS do not cause this problem.

This is caused by corrupted temporary data and has no known effect on any command other than SAVE.

Workaround:

Before the SAVE command, re-specify at least one of the TABLE properties.
For *example*:

```
CHANGES
MEMBER PROPERTIES
   1 TABLE 'CONRECT'   'REC10x18'
ADDITIONS

SAVE 'myfile.gts'
```

GTSTRUDL Program Report Form

<div align="right">

GPRF No.: _2006.3_

DATE: _1/6/06_

</div>

FROM: Computer-Aided Structural Engineering Center
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.

X 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 _1/6/06_

Date Notification Sent _1/6/06_

Computers __All__

Operating System __All__

Version ____Versions 28.0 & 28.1____

(signature)   _(signature)_
Signature   Title
R & D Division

Kenneth M. Will   _1/6/06_
Typed or Printed Name   Date of Signature

(signature)   Configuration Control Manager
Signature   Title
Professional Services Division

David C. Key   _1/6/06_
Typed or Printed Name   Date of Signature

Rev 2.5

GTSTRUDL Program Report Form
(Continued)

DESCRIPTION:

Incorrect results will be computed for loadings which contain JOINT DISPLACEMENTS when the new static analysis solver is used:

STIFFNESS ANALYSIS GTHCS

The user will know that this error has occurred as Statics Check Failures are output for loadings which contain the JOINT DISPLACEMENT loading specification.

Results are not affected when using the STIFFNESS ANALYSIS command without the GTHCS specification. Furthermore, results computed using STIFFNESS ANALYSIS GTHCS are correct for loading conditions which do not contain JOINT DISPLACEMENTS.

Workaround:

Use STIFFNESS ANALYSIS without GTHCS

Applicable Section of the Documentation:

STIFFNESS ANALYSIS command, Section 2.12 of Version 28 Release Guide.

Rev 2.5

GTSTRUDL Program Report Form

GPRF No.: _2006.4_

DATE: _1/6/06_

FROM: Computer-Aided Structural Engineering Center
Georgia Institute of Technology
Atlanta, Georgia 30332-0355

SEVERITY LEVEL:

X 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 _1/6/06_

Date Notification Sent _1/6/06_

Computers __All__

Operating System __All__

Version ___Versions 27.0, 28.0 & 28.1__

Signature
R & D Division

Kenneth M. Will
Typed or Printed Name

Signature
Professional Services Division

David C. Key
Typed or Printed Name

Title

_1/6/06_
Date of Signature

Configuration Control Manager
Title

_1/6/06_
Date of Signature

Rev 2.5

GPRF No.: 2006. 4

DATE: 1/6/06

Incorrect results will be computed for loadings which contain JOINT TEMPERATURE gradients under the following conditions:

1. The joints with the JOINT TEMPERATURE gradient specification have BPHT, BPHQ, SBHT, SBHQ, SBHT6 or SBHQ6 elements attached to them.

2. The JOINT TEMPERATURE gradient is specified in the GLOBAL system as shown in the example below:

    LOADING 1
    JOINT TEMPERATURE
    1 TO 10 GRADIENT Y 100. GLOBAL

Workaround:

Specify the JOINT TEMPERATURE gradient in the LOCAL system in the Z direction as shown below:

    LOADING 1
    JOINT TEMPERATURE
    1 TO 10 GRADIENT Z 100. **LOCAL**

Applicable Section of the Documentation:

JOINT TEMPERATURE Command, Section 2.3.5.3 of Volume 3 of the GTSTRUDL Reference Manual.

Rev 2.5

GTSTRUDL Program Report Form

GPRF No.: __2006.5__

DATE: __1/12/06__

FROM: Computer-Aided Structural Engineering Center
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.

X MINOR   Problem can be worked around or problem poses high frustration factor.

_ INFORMATIVE   Documentation error, program usage tip, user inconveniences.
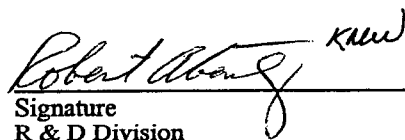

Date Problem Confirmed __1/12/06__

Date Notification Sent __1/13/06__
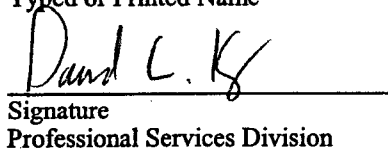
Computers __All__

Operating System __Windows__

Version __28.1 and earlier__

_____ *Knew*
Signature
R & D Division

__Developer__
Title

Robert Abernathy
Typed or Printed Name

__1/12/06__
Date of Signature

_____
Signature
Professional Services Division

__Configuration Control Manager__
Title

David C. Key
Typed or Printed Name

__1/13/06__
Date of Signature

Rev. 2.5

GTSTRUDL Program Report Form
(Continued)

Description:
When a column with spiral reinforcement is designed with the PROPORTION command and with an active metric length unit (meters, centimeters or millimeters), the output for the spiral design contains incorrect units and the printed spiral pitch is rounded down AFTER printing the value.

Not affected:
- Columns with TIES for secondary reinforcement, which includes all rectangular and square longitudinal bar arrangements and circular arrangements not specified as SPIRAL.
- Columns designed with non-metric length units (inches or feet).

After the PROPORTION command, the active length units have no effect on the stored data, and reporting may be done in any units with consistent output.

Explanation:
The output units for spiral diameter and spiral pitch are printed as "RECT" instead of "CM." Spiral diameters and pitches reported in the output of the PROPORTION command are always in centimeters for metric length units, not the actual current length, so the missing unit name is an inconvenience but should not lead to confusion about the actual values.

The printed spiral diameter is incorrect - it is in inch units regardless of the current active length unit.

The printed spiral pitch (which is always in CM for all metric length units) is a correct value. The problem occurs after the output is produced, before the design is stored in the GTSTRUDL data base. This correct design is rounded down the next whole inch, then stored. This causes subsequent output, such as from SCHEDULE or PRINT REINFORCEMENT, to be different from the PROPORTION output. This stored value is conservative, since the rounding is always to a smaller pitch. The stored value is also used for QUANTITY TAKEOFF and will result in slightly higher length and weight values than required.

Example: (... indicates removed output)
```
{   68} > UNITS CM
{   69} > PROPORTION MEMBER 1 GIVEN B 61.0
    ...
    COMPRESSION CONTROL        ...   SPIRALS 0.750RECT DIA AT 8.00RECT PITCH
    ...
{   70} > SCHEDULE COLUMNS MEMBER 1
    ...
1       61.0  DIA   304.8        6  NO   8     # 6 SPIRALS AT   7.62 PITCH
```

Workaround:
Use UNITS INCH for PROPORTION, then change to a metric unit for output.

Documentation:
Section 4.2 The DESIGN DATA Command, Volume 4, GTSTRUDL Reference Guide
Section 4.3 The PROPORTION MEMBERS Command, Volume 4, GTSTRUDL Reference Guide
Section 5.4 The PRINT REINFORCEMENT Command, Volume 4, GTSTRUDL Reference Guide
Section5.6 The SCHEDULE Command, Volume 4, GTSTRUDL Reference Guide

Rev. 2.5