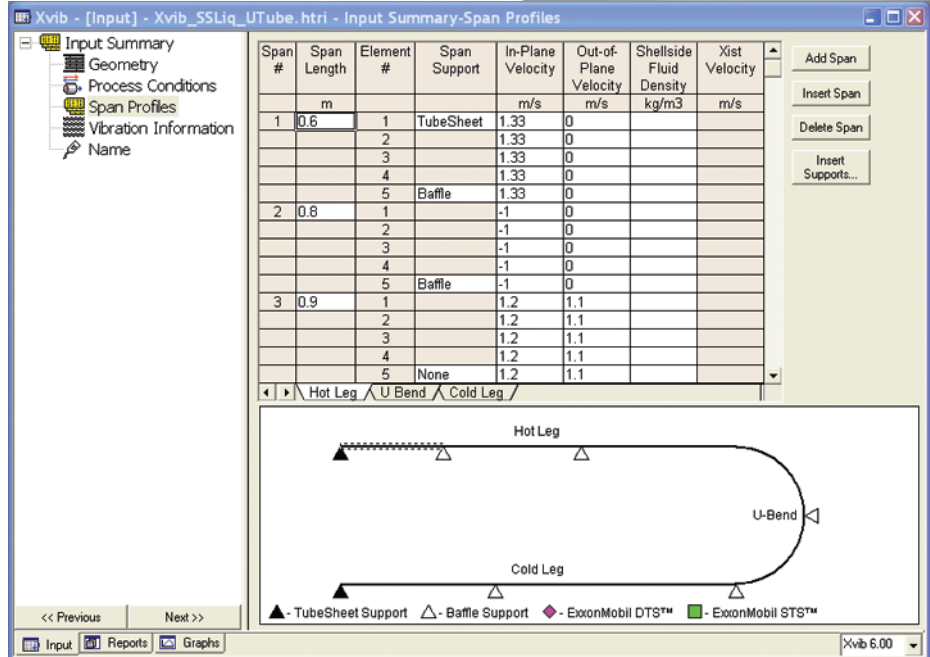




Analyze vibration potential of individual tubes

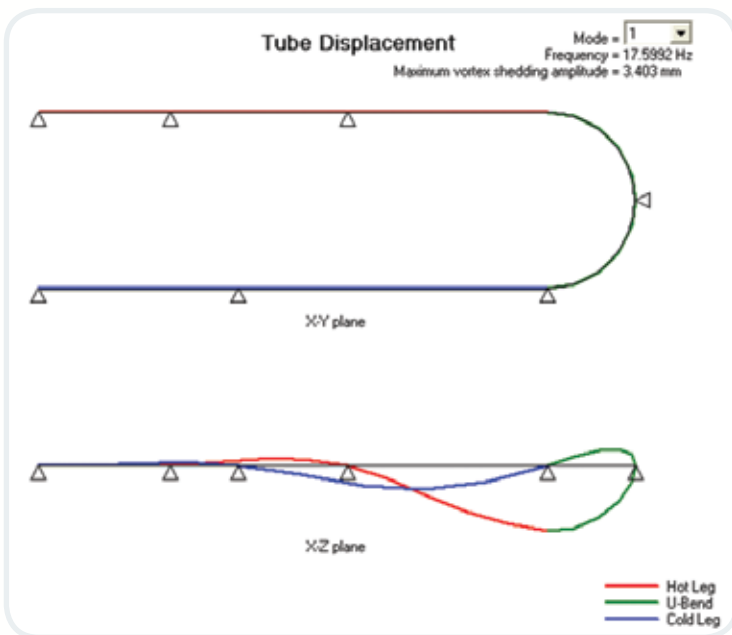
Xvib performs flow-induced vibration analysis of a single tube in a heat exchanger bundle. The program uses a rigorous structural analysis approach to calculate the tube natural frequencies for the first and higher modes and can properly handle any tube support arrangement.

Use Xvib in standalone mode or generate cases automatically from Xist® for shell-and-tube heat exchangers.



Features

- Xvib calculates first and higher mode frequencies for straight and U-tubes
- Tube deflections are calculated using finite element structural analysis methods
- Fluidelastic instability and vortex shedding vibration mechanisms are analyzed
- Static deflections for up to 15 modes of vibration can be calculated
- Program uses the familiar Xchanger Suite® interface and allows you to create cases directly from Xist runs
- Both input and output support multiple unit sets, and custom unit sets can be defined.



Geometry Specifications

- Plain or low-fin tubes
- Supports at any location on the tube or in the U-bend
- Tubesheet, baffle, U-Bend, DTSTM, and STSTM support types
- Up to 99 spans per tube
- Built-in databank for standard low-fin geometries

Calculation Features

- Rigorous calculation of tube natural frequency, up to first fifteen (15) modes
- Fluidelastic instability and vortex shedding vibration mechanisms
- Each span divided into multiple (5) elements
- Placement of multiple spans between supports for increased detail in analysis

Output Reports

- Summary report that indicates both the mode and span with vibration trouble spots in the tube
- Detailed vortex shedding report that details static deflection at every node of tube
- Detailed critical velocity report that provides ratio of local to critical velocity at every node of tube
- Selectable font sizes to make reports easy to view
- Extensive set of spreadsheet-style output reports that can be printed or exported to Microsoft® Excel®
- Customizable unit sets that can be changed dynamically as you work

Graphic Visualization

- Span profile drawing with location of all supports
- Tube layout drawing that indicates which tube in bundle is being modeled
- Tube displacement graph that identifies relative deflections for all calculate modes of vibration
- Velocity profile graph that lets you visualize input data

Minimum System Requirements

Xvib requires Microsoft Windows 2000 or later running on an Intel Pentium or compatible CPU with at least 128 MB RAM (512 MB for Windows Vista, Windows Server 2008, or Windows 7), and approximately 200 MB of free disk space.

HTRI recommends a 1GHz or faster processor, 1 GB RAM, the Windows XP operating system, and a graphics resolution of at least 1024 x 768. A complete installation of Xchanger Suite requires approximately 425 MB of available disk space.

Output Summary
Released to the following HTRI Member Company:
HTRI
Software Development

Xvib Ver. 6.00 2/13/2009 6:57 SN: 0000000006
Test Case 2
U-tube with one support

No Data Check Messages.
No Runtime Messages.

Vibration Data

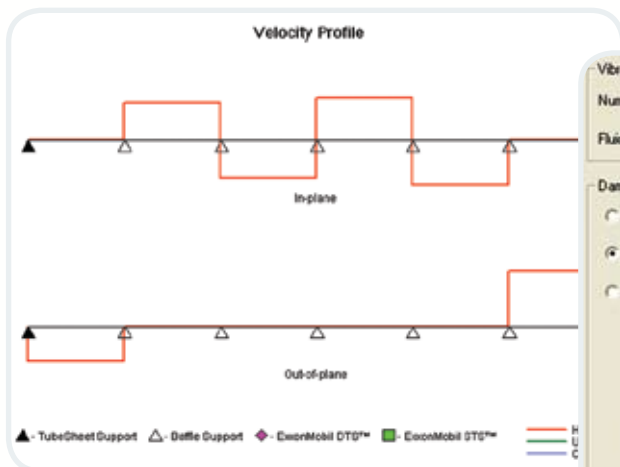
Number of spans		7
Average span length	(m)	0.976
Tube pitch	(mm)	40.000
Fluid density	(kg/m3)	240.278
Fluidelastic instability constant		18.484
Lift coefficient		0.1
Added mass factor		1.27401
Log decrement		0.03

Tube Material Information

Tube material		Low carbon nickel
Density	(kg/m3)	8885.60
Elastic modulus	(MPa)	206827
Effective weight	(kg/m)	1.29
Area moment of inertia	(mm4)	3048.7

Analysis Results

Mode: Tube Pass=2, Row=12, Tube=5



Vibration Parameters

Number of modes: 5
Added mass coefficient:
Fluidelastic instability constant:
Dynamic lift coefficient: 0.1

Damping - (Select One)

Normalized damping coefficient kg/s/m2

Log decrement: HTRI Method 0.03

Damping ratio input table ...

Number of points defining modal input table (max = 20): 10

Point Number	Frequency (rad/s)	Damping Ratio
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		



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