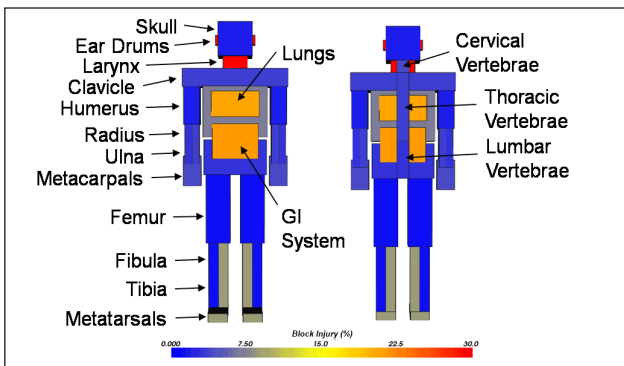


Explosion Damage Assessment

BREEZE® VASDIP (Vulnerability Assessment of Structurally Damaging Impulses and Pressures) is a Windows-based application used for assessing vulnerability of structures and humans resulting from explosion impacts. Blast damage and injury is communicated using Pressure-Impulse (P-I) diagrams. VASDIP uses recently developed P-I diagrams and allows users to specify detailed properties (including boundary conditions) of 24 different basic structural components and 19 different human body components.



The 19 different human body components found in BREEZE VASDIP.

BREEZE VASDIP is an excellent companion product for BREEZE ExDAM® and its HExDAM® (High Explosive Damage Assessment Model) and VExDAM® (Vapor Cloud Explosion Assessment Model) modules as it computes the corresponding vulnerability parameters for use within these applications. In addition, the user is able to compute changes in vulnerability as individual structural design and human component parameters are varied, allowing the user to optimize the design of the component. This increases the utility of the HExDAM and VExDAM modules and makes VASDIP invaluable when performing cost and risk analyses.

Features

- Capacity to handle both inanimate structures and human body components
- Generates P-I diagrams
- Calculates damage/injury for a given pressure and impulse
- Calculates vulnerability parameters for use with the BREEZE ExDAM HExDAM and VExDAM modules

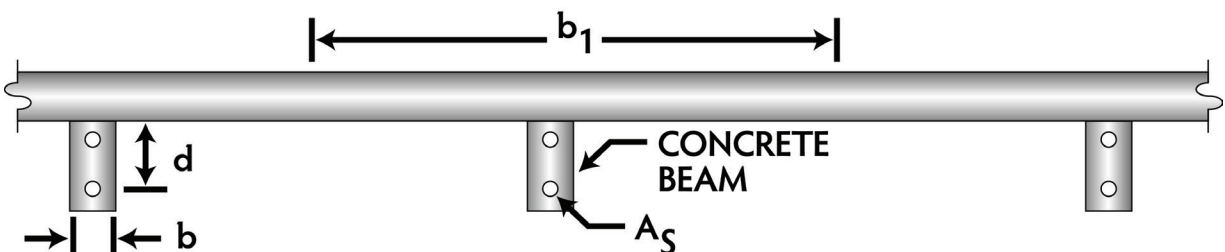
Inputs

The parameters that can be accounted for with BREEZE VASDIP vary with each structural and human component and are quite comprehensive. For example, the following parameters can be specified for a reinforced concrete slab:

- Slab span
- Cross-sectional area
- Section width
- Tensile steel area
- Boundary conditions
- Yield strength of reinforcement
- Compressive strength of concrete
- Depth of tensile reinforcement
- Weight density of section

For human body components, the following parameters can be specified:

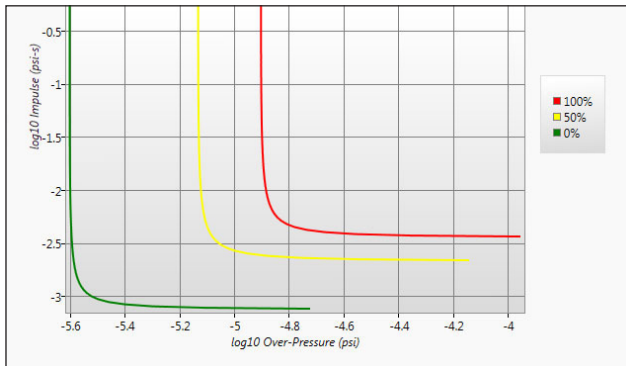
- Body weight
- Body height
- Height-to-width ratio



Outputs

BREEZE VASDIP generates three distinct outputs. The first is a color-coded P-I diagram that provides a clear picture of the three zones of structural and human response:

- Total destruction/fatality zone - 100%
- Partial damage/injury zone - 50%
- No damage/injury zone - 0%



Pressure-Impulse graph demonstrates the three zones of structural or human response.

The second output consists of damage and injury level resulting from a given pressure and impulse. In the Calculate Damage tab of the BREEZE VASDIP interface, the damage or injury percentage is calculated based on the specific values of overpressure and impulse entered for the selected component.

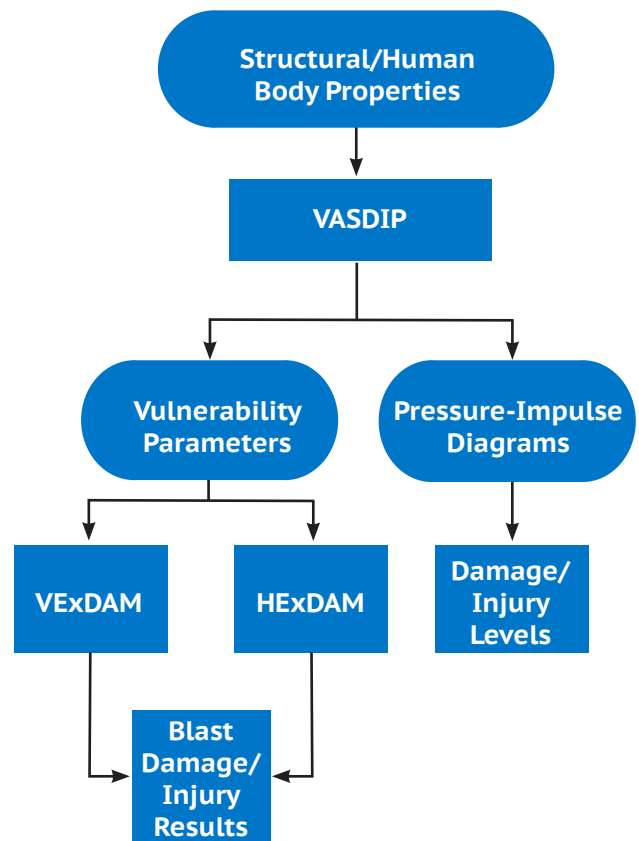
The third output displays specific vulnerability parameters that can be used for characterizing a structure and human body component in BREEZE ExDAM HExDAM and VExDAM modules. In order to calculate the parameters, users simply need to enter the reference yield and click on the Calculate Vulnerability button in order to produce the vulnerability parameters for the selected component. The calculated parameters are the:

- P/Q - P if the component is subject to overpressure, and Q if the component is subject to dynamic pressure
- P/Q Severe - the overpressure or dynamic pressure associated with severe damage to the component
- K Severe - the pulse duration factor associated with severe damage to the component
- P/Q Moderate - the overpressure or dynamic pressure associated with moderate damage to the component
- K Moderate - the pulse duration factor associated with moderate damage to the component

If the selected component is set to "All Human Components", then the vulnerability parameters are calculated for all 19 human body components.

These parameters are required for the ExDAM HExDAM and VExDAM modules so users have the option to easily export the calculated parameters in this Vulnerability tab by simply clicking the Export Vulnerability Parameters button.

Relationship between VASDIP, HExDAM, and VExDAM Modules



For a demonstration of VASDIP or for more information, contact the BREEZE team at breeze@trinityconsultants.com or +1 (972) 661-8881.

