

Energy – Stiffness Coefficients

Overview: Computes **A, B, G Stiffness values** using data obtained from car-barrier or car-impactor collisions.

Entry into Module:

This module of the program is normally entered by clicking on the **REC-TEC** block in the upper left of the **REC-TEC Window** causing the drop-down menu to appear. Place the cursor on the **Energy** block and click on **Stiffness Coefficients** on the sub-menu to initiate this module.

Under certain circumstances, the user may choose to use the **Files** block instead of the drop-down menu approach. Selecting any file with an **.ABG** extension in the **Dialog box** accessed from either the **Open Single File** or **Open Multiple Files** block opens this module.

Selecting **AutoLoad [ON]** from either the **Setup Menu** or the **AutoLoad Icon** on the upper right side (third line) of the **REC-TEC Window** automatically loads the two-vehicle scenario that was on the screen when the module was closed, either individually, or when the program was closed. With **AutoLoad [OFF]** on the main **REC-TEC Window**, modules will start without loading a file.

Data Entry:

This module contains the following data entry blocks:

Test Collision Data (Used to compute A, B & G Stiffness Coefficients)

- **Crush Energy Equivalent Speed** – Exemplar Vehicle in Test Crash
- **Maximum CEES without Permanent Damage**
- **Average Crush – Enter 0 (Zero) to Compute**
 - **Number of “C” Measurements**
 - **Length of (Each) “C” Measurement**
- **Test Vehicle Weight** – Exemplar Vehicle in Test Crash
- **Test Vehicle Damage Width** – Exemplar Vehicle in Test Crash

Output:

The three constants, A, B and G, have real physical meaning.

- **Stiffness Coefficient A** – The coefficient **A**, in units of force, represents the beginning of plastic deformation. Load increments of less than **A** will cause only elastic deformation, and, hence, no residual crush.
- **Stiffness Coefficient B** – The **B** coefficient represents the stiffness of the vehicle structure; its units are in lb/inch².

- **Stiffness Coefficient C** – The term **G** is an integration constant, which represents the elastic work, done to reach a force of **A**.

Options:

Several **Command Buttons** appear in a frame located at the lower right corner of the module Window. The **Command Buttons** allow the user to engage options including the option to **Open** and **Save** the data required to generate the scenario shown on the screen at the time the file was saved.

- **Open .ABG File** – Calls up a **Dialog** box, which **Opens** any pre-existing **.CRS** file and displays the output results.
- **Save .ABG File** – Calls up a **Dialog** box, which **Saves** data on the screen to files with any user-selectable filenames. This is independent of the automatic saving as “**LastFile.ABG**” of the data at the close of this module or the close of the program.
- **Graphics Suite** – Toggles Graphic display of **Linear Crush Resistance**.
- **N** – This button toggles a graphical number pad on the screen that can be used to enter data into the input boxes without using your keyboard number pad. This may be useful for presentations as data entry can be accomplished using a wired/wireless mouse.