

Time Distance – Deceleration

Overview: Computes detailed information on the Speed, Distance and Time of a single deceleration event. If lateral information is input, the module also computes detailed swerve and swerve-and-return data.

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 **Time - Distance** block and click on **Deceleration – Single Surface** 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 a **.TDD** 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 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 within the leftmost frame:

- **Mu (Deceleration) - required**
- **Grade (Test) – not required (default is zero)**
- **Grade (Scene) – not required (default is zero)**
- **Braking (%) – required**
- **Distance**
- **Time**
- **Speed (Initial)**
- **Speed (Final)**
- **Lateral Distance (Optional for Swerve / Swerve and Return)**

Entry of Deceleration, Grade and Braking plus two of the four remaining variables in the data boxes is sufficient to generate a solution and causes output information to appear in the **Output** frame. As the input data is changed, the output data is automatically updated without the need to tell the program to update the output. The user is instructed to decrease the inputs if three or more variables are input.

Output:

The output from this module consists of the repeated input variables plus all of the

unknowns that were not entered into the left **Input** frame expressed in the primary and secondary configurations. If the deceleration either as entered, or as computed, was not to a final speed of zero, the times and distances are shown for both the event as defined with the input variables and to a stop.

Optional Output:

If a **Lateral Distance** is entered, three additional Frames will appear on the right side of the screen showing **Swerve** and **Swerve & Return** information.

The top frame heading shows the entered lateral distance. The next two lines show the **Maximum Lateral Distance** along the Y-Axis that can be reached if the maneuver is started from the Slide to Stop Distance on the X-Axis for each of the maneuvers involved.

The left (**Swerve – No Return**) and the right (**Swerve and Return**) frames show the following:

- **Distance** - X-Axis distance required for the maneuver
- **Hypotenuse** – Straight-line distance from the start of the maneuver to the Y-Axis point at the Lateral Distance
- **Arc Angle** – The angle or combined angles through which the vehicle has traveled in the maneuver
- **Arc Radius** – Radius of the turn(s) required for the maneuver(s)
- **Arc Distance** – Distance traveled by the vehicles following the arc(s) required for the maneuver
- **Arc Time** – Time required for the maneuver if Initial Speed is maintained

Critical Turnaway is a **Speed** at which the **Distance Slide to Stop** and the **Distance required** for the **Swerve** (or **Swerve and Return**) maneuver are identical. Again, **Critical Turnaway is a Speed at which two distances are identical**. It is similar to a point of no return.

- **Critical Turnaway Distance** – Distance for both Slide to Stop and Distance required for the maneuver
- **Critical Turnaway Time** – Time required to stop from the Initial Speed
- **Critical Turnaway Speed** – The Speed at which the Distance Slide to Stop and the Distance required for the Swerve (or Swerve and Return) maneuver are identical

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 .TDD File** – Calls up a **Dialog box**, which **Opens** any pre-existing **.TDD** file and displays the output results.
- **Save .TDD 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.TDD**” of the data at the close of this module or the close of the program.
- **Formulae** – Opens a word processor (set by the user in **Setup**) with a file showing the basic formulae used in this module of the program. While the user may add to or modify the information in this file, it does not change the formulae imbedded into the program.
- **Formulae*** - Toggles a frame displaying the formulae for computing the unknowns in this module. In addition to the basic formulae, the frame shows intermediate steps with the actual input data shown in the computation.
- **Animation** – by **Time** or **Distance** in real time (1:1) or slow motion. The display shows the Deceleration curve in the upper block and the Swerve (upper middle block) and Swerve & Return (lower middle block). Time (top scale) and Distance (bottom scale) is shown for all three curves. Animation may be stopped and resumed using the mouse or the spacebar. **[Esc]** to Exit
- **Graphics** – Displays the graphics curves for Time (with scales) on the upper half and Distance (with scales) on the lower half of the screen. The right and left scales show the Speed. **[Esc]** to Exit
- **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.
- **Iteration / FDA Menu** – Calls up a frame that permits the user to input the minimum and maximum values for selected input variables along with the interval for **Iteration**. If **Finite Difference Analysis (FDA)** is selected, the resulting analysis computes the uncertainty level for the specified range of the input variables.

For a more in-depth description of **Finite Difference Analysis**, see the Finite Difference Analysis Section of this Manual – Press **[F2]** from any Active module of the program.