

Time Distance – Motion Analysis

Overview: Computes speed dissipation from wheel forces due to position. It can be used for spins, yaws or decelerations.

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 **Motion Analysis (1 – 99 Phases)** 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 **.MAN** 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 can be used for either a Critical Speed Maneuver or a Spin. Analysis is by position (Work-Energy computation). Entries are made in the data entry blocks contained within the three leftmost frames and consist of the following:

Common:

- **Number of Phases**
- **Mu (Deceleration) - Baseline Surface Friction for all Phases**
- **Rolling Resistance - Baseline Rolling Resistance for all Phases**
- **Final Speed**
- **Front Weight %**
- **Initial Slip Angle**
- **KeyFrame/Time - Entering KeyFrame shows start time for Animation Output files (Hi-Res Animation)**

Phase Inputs

- **Phase (Current Phase of Total Number of Phases)**
- **Mu (Phase Adjustment to Baseline Surface Friction – Includes change due to Grade for 3D)**
- **Rolling Resistance (Phase Adjustment to Baseline Rolling Resistance)**

Datum Line/Distance

- **Linear (Phase only)**
- **Offset (Total)**
- **Vehicle Airborne (Phase) check block - Object will not decelerate during this phase if checked**
- **Z-Axis Height - Elevation of Road Surface (Z-Axis Height) over which vehicle is traveling – The Surface Friction (μ) must be adjusted for change in Grade.**
- **Final Slip Angle (Phase)**

Phase Inputs

Slip Angle Adjustments (Degrees)

- **Left Rear**
- **Left Front**
- **Right Front**
- **Right Rear**

Percent of Braking (0 to 100)

- **Left Rear (0 to 100)**
- **Left Front (0 to 100)**
- **Right Front (0 to 100)**
- **Right Rear (0 to 100)**

Output

The output from this module is in the form of Animation or a Data Table, which are accessed from the Command Buttons.

Table Legend

- **#** – Phase Number
- **Dist** – Distance Parallel to Datum Line (Phase Only)
- **Dist** – Distance Parallel to Datum Line (Cumulative)
- **Dist** – Distance Traveled by Center of Mass (Phase Only)
- **Dist** – Distance Traveled by Center of Mass (Cumulative)
- **Offset** – Distance Perpendicular to Datum Line
- **Time** – Phase
- **Time** – Cumulative
- **VSA** – Vehicle Slip Angle (Average)
- **LR** – Left Rear Adjustment (Right = Positive | Left = Negative)

- **LF** – Left Front Adjustment (Right = Positive | Left = Negative)
- **RF** – Right Front Adjustment (Right = Positive | Left = Negative)
- **RR** – Right Rear Adjustment (Right = Positive | Left = Negative)
- **f(T)** – Total Drag Factor (Vehicle)
- **LR** – Left Rear – Drag Factor
- **LF** – Left Front – Drag Factor
- **RF** – Right Front – Drag Factor
- **RR** – Right Rear – Drag Factor
- **Speed** – Speed (Primary)
- **Speed** – Speed (Secondary)

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 .CSV File** – Calls up a **Dialog box**, which can **Open** a pre-existing **CadZone (.CSV)** file and then displays the output results.
- **Open .MAN File** – Calls up a **Dialog box**, which **Opens** any pre-existing **.MAN** file and displays the output results.
- **Save .MAN 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.MAN**” of the data at the close of this module or the close of the program.
- **Animation** – Toggles Animation of Input information. User selectable Rectangles or Arrowheads depict object’s position. Tilt of Z-Axis and the display of the vehicle’s track are user selectable. The display shows the position of the object in relation to the Datum Line with scales for distance showing linear and offset values. Animation may be manual or automatic as selected by user and has data block showing information computed for each position. **[Esc]** to Exit
- **Data** – Displays a table of all Phases with the times, distances and deceleration information for each phase.
- **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.

- **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.