

# Hazus Flood Assessment Structure Tool (FAST)

## Damage Function Customization

FAST damage functions are stored as percent damage values at each one-foot increment of flood water. This range of depth damage values varies for each specific occupancy class used in Hazus. Depth damage values for content, inventory, and structure damages for each specific occupancy class are stored in the “fIBldgContDmgFn.csv”, “fIBldgInvDmgFn.csv”, and “fIBldgStructDmgFn.csv” tables (respectively) in the “Lookuptables” subfolder of the FAST zip download (Figure 1).

Each depth damage function corresponds to a unique numeric code used to assign that function to input building data during FAST loss calculations. Any depth damage function can be assigned to any building type by inserting the appropriate numeric code from the “ContDmgFnID”, “InvDmgFnID”, and “BldgDmgFnID” fields in each lookup table to the ContentDDF, InventoryDDF, and BuildingDDF fields of input building data. Review the formatting guidelines for FAST building data inputs to correctly assign depth damage function to each building type: <https://github.com/nhrap-hazus/FAST/blob/master/Help/FASTBuildingData.pdf>. Percent damage values for individual functions can be edited at each increment of flood water using the “p0,” “p1,” “p2,” etc. fields in each damage function table (Figure 2).

| Name                                   | Date modified     | Type                  | Size   |
|--|-------------------|-----------------------|--------|
| FAST                                   |                   |                       |        |
| Help                                   |                   |                       |        |
| Images                                 |                   |                       |        |
| Log                                    |                   |                       |        |
| Lookuptables                           |                   |                       |        |
| Python_env                             |                   |                       |        |
| rasters                                |                   |                       |        |
| src                                    |                   |                       |        |
| UDF                                    |                   |                       |        |
| .gitignore                             |                   |                       |        |
| FAST.py                                |                   |                       |        |
| FAST_Preprocessing.py                  |                   |                       |        |
| LICENSE                                |                   |                       |        |
| README.md                              |                   |                       |        |
| AllDDF.xlsx                            | 4/29/2020 4:21 PM | Microsoft Excel W...  | 188 KB |
| Building_DDF_CoastalA_LUT_Hazus4p0.csv | 4/29/2020 4:21 PM | Microsoft Excel Co... | 12 KB  |
| Building_DDF_CoastalV_LUT_Hazus4p0.csv | 4/29/2020 4:21 PM | Microsoft Excel Co... | 12 KB  |
| Building_DDF_Riverine_LUT_Hazus4p0.csv | 4/29/2020 4:21 PM | Microsoft Excel Co... | 33 KB  |
| Content_DDF_CoastalA_LUT_Hazus4p0.csv  | 4/29/2020 4:21 PM | Microsoft Excel Co... | 12 KB  |
| Content_DDF_CoastalV_LUT_Hazus4p0.csv  | 4/29/2020 4:21 PM | Microsoft Excel Co... | 12 KB  |
| Content_DDF_Riverine_LUT_Hazus4p0.csv  | 4/29/2020 4:21 PM | Microsoft Excel Co... | 37 KB  |
| DefaultDDFAssignmentTables.xlsx        | 4/29/2020 4:21 PM | Microsoft Excel W...  | 36 KB  |
| fIBldgContDmgFnFinal.csv               | 4/29/2020 4:21 PM | Microsoft Excel Co... | 5 KB   |
| fIBldgContDmgFn.csv                    | 4/29/2020 4:21 PM | Microsoft Excel Co... | 85 KB  |
| fIBldgContDmgFn_DDF.csv                | 4/29/2020 4:21 PM | Microsoft Excel Co... | 86 KB  |
| fIBldgEconParamOwnerOccupied.csv       | 4/29/2020 4:21 PM | Microsoft Excel Co... | 1 KB   |
| fIBldgEconParamRecaptureFactors.csv    | 4/29/2020 4:21 PM | Microsoft Excel Co... | 1 KB   |
| fIBldgEconParamRental.csv              | 4/29/2020 4:21 PM | Microsoft Excel Co... | 1 KB   |
| fIBldgEconParamSalesAndInv.csv         | 4/29/2020 4:21 PM | Microsoft Excel Co... | 1 KB   |
| fIBldgEconParamWageCapitalIncome.csv   | 4/29/2020 4:21 PM | Microsoft Excel Co... | 2 KB   |
| fIBldgInvDmgFnFinal.csv                | 4/29/2020 4:21 PM | Microsoft Excel Co... | 2 KB   |
| fIBldgInvDmgFn.csv                     | 4/29/2020 4:21 PM | Microsoft Excel Co... | 18 KB  |
| fIBldgInvDmgFn_DDF.csv                 | 4/29/2020 4:21 PM | Microsoft Excel Co... | 18 KB  |
| fIBldgStructDmgFnFinal.csv             | 4/29/2020 4:21 PM | Microsoft Excel Co... | 5 KB   |
| fIBldgStructDmgFn.csv                  | 4/29/2020 4:21 PM | Microsoft Excel Co... | 97 KB  |
| fIBldgStructDmgFn_DDF.csv              | 4/29/2020 4:21 PM | Microsoft Excel Co... | 97 KB  |

**Figure 1:** Building damage parameters are stored in the “fIBldgContDmgFn.csv”, fIBldgInvDmgFn.csv”, and “fIBldgStructDmgFn.csv” tables.

| A           | B         | C          | D   | E  | F  | G  | H  | I  | J  | K  | L  | M  |
|-------------|-----------|------------|---|----|----|----|----|----|----|----|----|----|
| ContDmgFnID | Occupancy | Source     | Description   | m4 | m3 | m2 | m1 | p0 | p1 | p2 | p3 | p4 |
| 21          | RES1      | FIA        | one floor, no basement, Contents, A-Zone            | 0  | 0  | 0  | 0  | 12 | 25 | 35 | 36 | 38 |
| 22          | RES1      | FIA        | one floor, w/ basement, Contents, A-Zone            | 0  | 5  | 7  | 8  | 16 | 20 | 22 | 28 | 33 |
| 23          | RES1      | FIA        | two floors, no basement, Contents, A-Zone           | 0  | 0  | 0  | 0  | 8  | 11 | 19 | 23 | 28 |
| 24          | RES1      | FIA (MOD.) | two floors, w/ basement, Contents, A-Zone           | 0  | 5  | 7  | 8  | 16 | 18 | 25 | 29 | 33 |
| 25          | RES1      | FIA (MOD.) | three or more floors, no basement, Contents, A-Zone | 0  | 0  | 0  | 0  | 7  | 15 | 21 | 22 | 23 |
| 26          | RES1      | FIA (MOD.) | three or more floors, w/ basement, Contents, A-Zone | 0  | 5  | 7  | 8  | 15 | 22 | 27 | 28 | 29 |
| 27          | RES1      | FIA        | split level, no basement, Contents, A-Zone          | 0  | 0  | 0  | 0  | 8  | 11 | 19 | 23 | 28 |
| 28          | RES1      | FIA (MOD.) | split level, w/ basement, Contents, A-Zone          | 0  | 5  | 7  | 8  | 16 | 18 | 25 | 29 | 33 |
| 29          | RES1      | FIA        | one floor, no basement, Contents, V-Zone            | 0  | 0  | 0  | 0  | 10 | 17 | 23 | 29 | 35 |
| 30          | RES1      | FIA        | one floor, w/ basement, Contents, V-Zone            | 0  | 5  | 7  | 8  | 15 | 20 | 22 | 28 | 33 |

**Figure 2:** Content, inventory, and building damage function ID values (Content example highlighted in yellow) are used to assign each damage function to the appropriate building type using matching values in the “ContentDDF,” “InventoryDDF,” and “BuildingDDF” fields of input building data. Percent damage values are stored in one-foot increments in fields highlighted in blue. Percent damage values for flood heights below a building’s first finished floor are stored in fields highlighted in orange.