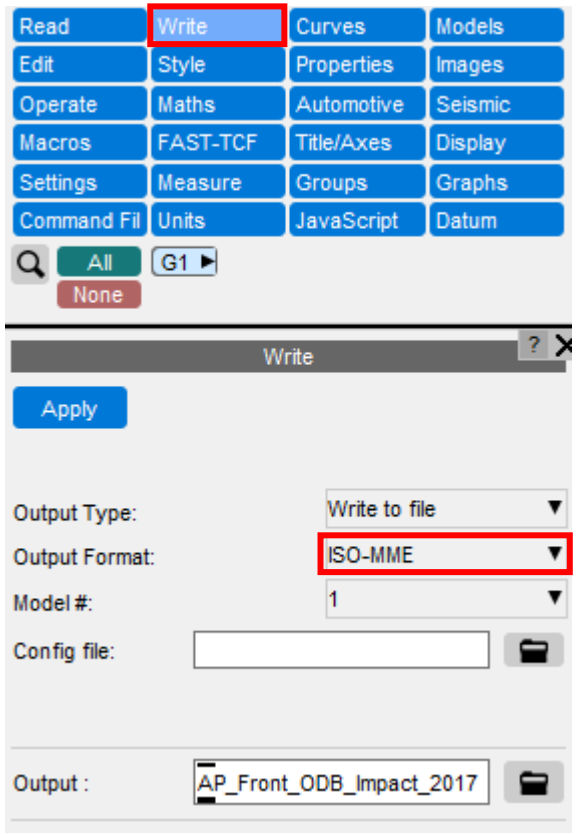
Oasys
T/HIS

Writing ISO-MME Files

Writing ISO-MME Files

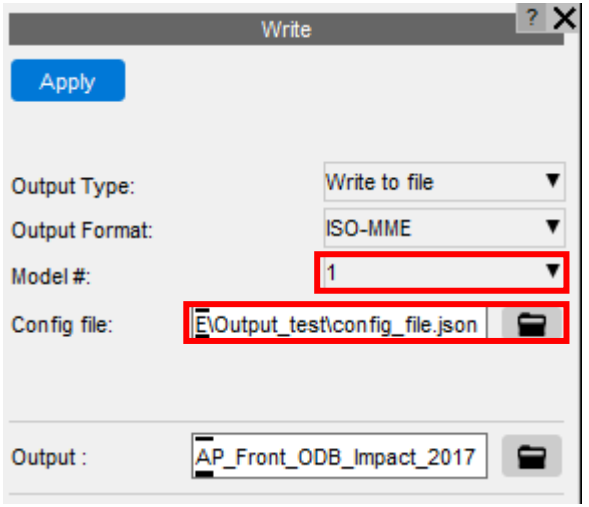
The ISO-MME format (ISO/TS 13499) is a data exchange format for crash analyses comprising a number of folders and files.

The option to write data in this format is included in T/HIS, but the method for doing so differs slightly to other write formats, so this tutorial shows how to use it.



Writing ISO-MME Files

To write ISO-MME files, instead of selecting curves that you want to write out, you have to select a model for T/HIS to extract the data from and provide a configuration file to specify what data should be written out.



The configuration file is needed because the naming conventions of the output files, set out in the ISO standard, follow specific rules which require extra data that isn't present in the curves alone and they also contain lines at the top of the files which describe the data in more detail.

Writing ISO-MME Files

The ISO-MME configuration file is a JSON format file used to tell T/HIS what curves to generate, the data to extract, from which entities to extract it from, their locations in the model and whether any filtering or operation is required.

This tutorial will show what needs to be written to this configuration file, but before that it will be helpful to show the structure of the directory where the various ISO-MME files get written out and the files it contains.

Overview

Writing ISO-MME Files

The ISO-MME format contains the following folders and files.

ISO-MME Version 1.6	ISO-MME Version 2.0
Output Dir | |-- <Virtual Testing reference ID>.mme <= Test Data | |-- Channel | |-- <Virtual Testing reference ID>.chn <= Channel index file |-- <Virtual Testing reference ID>.001 <= Channel data files |-- <Virtual Testing reference ID>.002 . |-- <Virtual Testing reference ID>.003 .	Output Dir | |-- <testname>.mme <= Test information file | |-- Channel | |-- <testname>_Channel.mmi <= Channel index file |-- <testname>_<channel_code>.mmd <= Channel data files |-- <testname>_<channel_code>.mmd . |-- <testname>_<channel_code>.mmd . | |-- Object | |-- <testname>_<object_code>.mmi <= Object files |-- <testname>_<object_code>.mmi . |-- <testname>_<object_code>.mmi .

Details of each file are described in the following pages.

Writing ISO-MME Files

The test information file *<testname>.mme*, describes the test and the objects (vehicles, dummies, barriers) in it. As an example:

ISO-MME Version 1.6

```
Data format edition number  :1.6
Customer name               :ARUP
Customer test ref. number   :NOVALUE
Customer project ref. number:9999
Title                       :NOVALUE
Timestamp                   :2022-09-29
13:30:00
Type of the test            :NOVALUE
Subtype of the test         :NOVALUE
Virtual Testing reference ID:NOVALUE
Regulation                  :NOVALUE
Date of the test            :2022-10-02
Name of test object 1       :NOVALUE
Ref. number of test object 1:NOVALUE
Velocity test object 1 lon. :NOVALUE
Velocity test object 1 lat. :NOVALUE
Mass test object 1          :1230
Driver position object 1    :3
Impact side test object 1   :LE
Name of test object 2       :NOVALUE
Ref. number of test object 2:NOVALUE
Velocity test object 2 lon. :NOVALUE
Velocity test object 2 lat. :NOVALUE
Mass test object 2          :1230
Driver position object 2    :2
Impact side test object 2   :LE

Type of data source         :Simulation
```

ISO-MME Version 2.0

```
Data format edition number  :2.0
Timestamp                   :2020-11-10
Laboratory name             :Arup
Laboratory contact name     :NOVALUE
Laboratory contact phone    :NOVALUE
Laboratory contact fax      :NOVALUE
Laboratory contact email    :NOVALUE
Laboratory test ref number  :NOVALUE
Type of the test            :NOVALUE
Subtype of the test         :NOVALUE
Regulation                  :NOVALUE
Date of the test            :NOVALUE
Number of test objects      :2
#Begin of testobject
Type                        :D
Filename                    :my_test_D0.mmi
#End of testobject
#Begin of testobject
Type                        :1
Filename                    :my_test_1.mmi
#End of testobject
```

Writing ISO-MME Files

The object files <*testname*>_<*object_code*>.*mmi,* describe each object (vehicles, dummies, barriers) in the test. As an example:

```
Name                                :H350
Velocity                            :NOVALUE
Mass                                :NOVALUE
Impact side                         :00
#Begin of biomechanical
Gender                              :male
Age                                 :21
#End of biomechanical
```

These files are only required in ISO-MME Version 2.0

Writing ISO-MME Files

The channel index file *<testname>_Channel.mmi or <testname>.chn,* lists the channel data files. As an example:

ISO-MME Version 1.6 (.chn file)	ISO-MME Version 2.0 (.mmi file)
Instrumentation standard : Not applicable Number of channels :7 Name of channel 001 :13HEAD0000WSACX0 Name of channel 002 :13HEAD0000WSACY0 Name of channel 003 :13HEAD0000WSACZ0 Name of channel 004 :13HEAD0000WSDCX0	Number of channels :3 Data origin :S Data source : simulation #Begin of channel Extended channel code :D0HEADMI0000000B #End of channel #Begin of channel Extended channel code :D0CHSTMI0000000C #End of channel #Begin of channel Extended channel code :D0PELVMI0000000C #End of channel

Writing ISO-MME Files

The channel data files *<testname>_<channel_code>.mmd or <testname>.001*, contain the time series data. As an example:

ISO-MME Version 1.6 (.001 file)		ISO-MME Version 2.0 (.mmd file)	
Test object number	:1	Data structure	:Channel
Name of the channel	:	Instrumentation standard	:NOVALUE
Laboratory channel code	:NOVALUE	Name of the channel	:Accel x - Node 52503304 : (PelvisAccel_INJURY) (Reg 0.100E-03) (C 180)
Customer channel code	:NOVALUE	Data source	:simulation
Channel code	:13HEAD0000WSACX0	Data status	:ok
Unit	:m / (s * s)	Cut off frequency	:NOVALUE
Reference system	:NOVALUE	Channel amplitude class	:NOVALUE
Transducer type	:NOVALUE	Sampling interval	:0.0001
Pre-filter type	:NOVALUE	Bit resolution	:NOVALUE
Cut off frequency	:NOVALUE	Time of first sample	:0
Channel amplitude class	:NOVALUE	Number of samples	:1500
Sampling interval	:0.0001	Reference channel	:implicit
Bit resolution	:NOVALUE	#Start of data	
Time of first sample	:NOVALUE	-6.09125e-05	
Number of samples	:1999	-1785.28	
-0.42144		-3315.55	
-0.00030		.	
-0.00028		.	
		#End of data	

Writing ISO-MME Files

There are a number of options that can be set in the configuration file, but only a limited number of them are required.

The next page shows an example file using all the available options.

Writing ISO-MME Files


```
{
    "testName": "Far side",
    "timestamp": "12/18/2023, 4:24:25 PM",
    "formatVersion": "1.6",
    "laboratoryName": "Oasys LS-DYNA Environment",
    "customerName": "Euro NCAP",
    "customerTestRefNumber": "001",
    "customerProjectRefNumber": "1234",
    "virtualTestingReferenceId": "FS_Pole_75_X-ref_z-ref_50M_Sim_1",
    "typeOfTest": "SideImpact",
    "subtypeOfTest": "Far Side + VTC",
    "regulation": "EuroNCAP",
    "testDate": "12/18/2023",
    "unitSystemModel": "U2",
    "unitSystemDisplay": "U1",
    "descriptors": [
        {
            "description": "Type of data source",
            "value": "Simulation"
        },
        {
            "description": "Dummy Simulation Model Specification",
            "value": "WSID 50 M v3.4.1"
        }
    ],
    "dummies": [
        {
            "testObject": "1",
            "position": "1",
            "vehicleTestObject": "1",
            "name": "PDB WSID 50M 4.0",
            "gender": "male"
        }
    ],
    "vehicles": [
        {
            "testObject": "1",
            "position": "0",
            "driverPosition": "1",
            "name": "Lighting McQueen",
            "refNumber": "NO VALUE",
            "mass": "NO VALUE",
            "impactSide": "RI",
            "descriptors": [
                {
                    "description": "Vehicle Model",
                    "value": "95"
                }
            ]
        }
    ],
    "channels": [
        {
            "testObject": "1",
            "position": "1",
            "mainLocation": "ABRI",
            "fineLocation1": "RI",
            "fineLocation2": "01",
            "fineLocation3": "WS",
            "physicalDimension": "AN",
            "direction": "#",
            "entityType": "spring",
            "component": "rotation",
            "id": 10324,
            "write": false
        },
        {
            "testObject": "1",
            "position": "1",
            "mainLocation": "ABRI",
            "fineLocation1": "RI",
            "fineLocation2": "02",
            "fineLocation3": "WS",
            "physicalDimension": "AN",
            "direction": "#",
            "entityType": "spring",
            "component": "rotation",
            "id": 10325,
            "write": false
        },
        {
            "testObject": "0",
            "position": "0",
            "mainLocation": "EKIN",
            "fineLocation1": "SU",
            "fineLocation2": "00",
            "fineLocation3": "00",
            "direction": "0",
            "physicalDimension": "EN",
            "entityType": "whole",
            "filter": "C",
            "component": "kinetic",
            "write": true
        },
        {
            "testObject": "0",
            "position": "0",
            "mainLocation": "EHOU",
            "fineLocation1": "SU",
            "fineLocation2": "00",
            "fineLocation3": "00",
            "direction": "0",
            "physicalDimension": "EN",
            "entityType": "whole",
            "filter": "A",
            "component": "hourglass",
            "write": true,
            "descriptors": [
                {
                    "description": "Energy Type",
                    "value": "Hourglass Energy"
                }
            ]
        }
    ],
    "operations": [
        {
            "operation": "sub",
            "input": [
                "11ABRIRI02WSAN#0",
                1.570796
            ],
            "output": "11ABRIRI02WSANZ0",
            "write": false
        },
        {
            "operation": "c180",
            "input": [
                "11ABRIRI02WSANZ0"
            ],
            "output": "11ABRIRI02WSANZC",
            "write": true,
            "descriptors": [
                {
                    "description": "Abdomen Compression valid Value",
                    "value": "46"
                },
                {
                    "description": "Abdomen Compression Invalid Value",
                    "value": "65"
                }
            ]
        }
    ]
}
```

Writing ISO-MME Files

Descriptions for each option are described in the T/HIS manual.

The following shows the minimum set of options that need to be defined for T/HIS to be able to write the ISO-MME files.

Property	Description	Valid values
testName	Name of test.	Any value
thisVersion	T/HIS Build Version	Any Numerical value. For Eg:- “21.0”
thisBuildNumber	T/HIS Build Number	Any numerical value. For Eg:- “6100”

Property	Description	Valid values
testObject	testObject classification.	See the 'Test Object' section in the ISO Related Electronic Document B for valid values, e.g. "1", "2", “D” etc.
position	The dummy’s position in the vehicle.	See the ‘Position’ section in the ISO Related Electronic Document B for valid values, e.g. “1”, “2”.

Property	Description	Valid values
testObject	testObject classification. It is the first character in the ISO-MME channel code.	See the 'Test Object' section in the ISO Related Electronic Document B for valid values, e.g. "1", "2", “D” etc.
position	The dummy’s position in the vehicle. It is the second character in the ISO-MME channel code.	See the 'Position' section in the ISO Related Electronic Document B for valid values, e.g. "1", "2".
mainLocation	Main location on the object. This is required for the channel code.	See the ISO Related Electronic Document B for valid values, e.g. "HEAD", "CHST".

Example

Writing ISO-MME Files

So, to write out the ISO-MME files you will first need to create the configuration file. Currently this has to be done by hand in a text editor.

A simple example to write data for a node is shown below.

Copy and edit it, setting the “id” to a valid id in your model. You may also want to set the “mainLocation” value to something other than “PELV” depending on where the node is in the dummy.

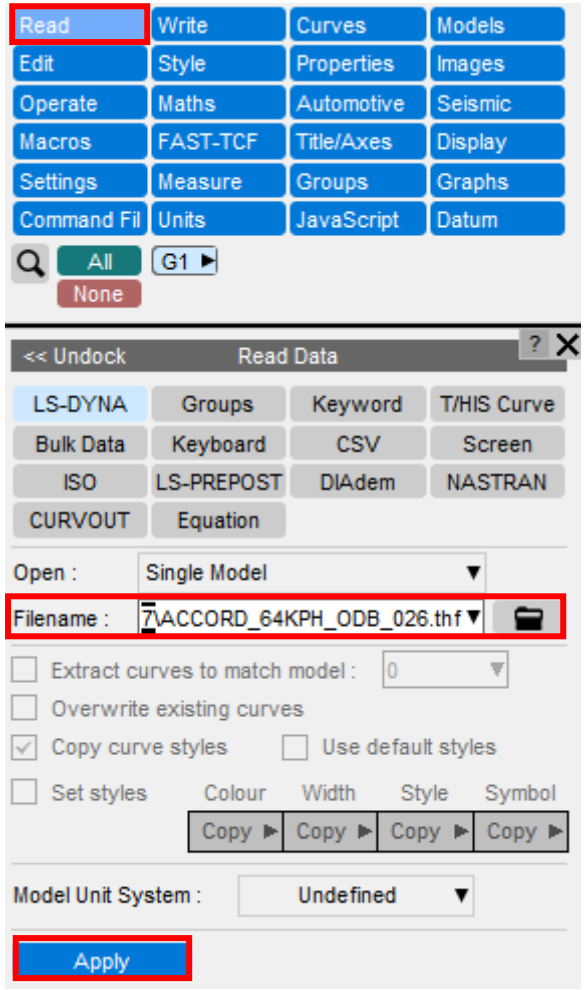
```
{
   “testName”: “my_first_test”,
   “thisBuildNumber”: “6500”,
   “thisVersion”: “21.0”,

   "dummies": [
      {
                “testObject”: ”1”,
                “position”: “1”
      }
   ],
   "channels": [
          {
                 “testObject”: ”1”,
                 “position”: “1”,
                “mainLocation”: "PELV",
                “entityType”: “node”,
                 “id”: “55501787”,
                 “component”: “displacement x”
          }
   ]
}
```

Save the file as ***config.json***

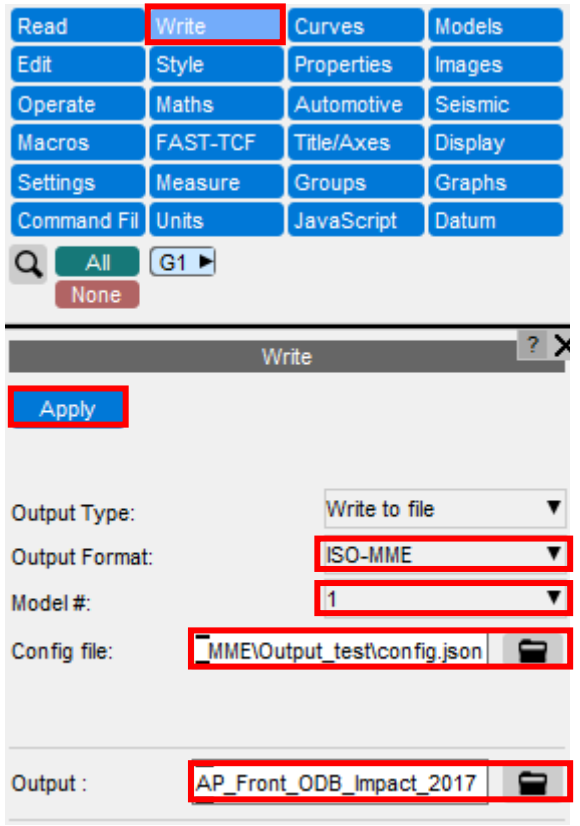
Writing ISO-MME Files

In T/HIS read in the model you want to write ISO-MME files for.



Writing ISO-MME Files

In the *Write* menu:



1. Set the output format to 'ISO-MME'
2. Select the model that you read in
3. Select the config file
4. Select a directory to output the files to
5. Press Apply

T/HIS will then generate the curves defined in the configuration file and write the ISO-MME files to the output directory.

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