

Appendix C. Downloading Data

James W. Phillips, John D. Williams, and David E. Farrow

Retrieving the laboratory files

Within 24 hours of the end of a lab period, the laboratory supervisor will place the laboratory data files on a web server for retrieval by the students.

Data files may be retrieved by direct link from <http://mtl.illinois.edu/data/>, where the various hosted courses' data files are organized by semester, course, lab experiment, and section number. The filenames are designed to indicate basic information about any specific test, such as the course, section, student group, specimen material, and certain specific test parameters of interest. Navigate to an appropriate directory of data files and download the desired data file(s) to your local computer storage, using the file download method specific to the web browser you are using.

Data files may also be retrieved by direct link from the laboratory schedule on the course web site as posted.

Open each file in a suitable spreadsheet application, such as Microsoft Excel. You can often perform this step simply by dragging the saved file icon onto the application's icon. Data files are comma-separated-variable ASCII files (if created by Instron Bluehill® or by Instron® CEAST® VisualIMPACT®) or tab-delimited ASCII files (if created by LabVIEW®), meaning that the text entries (fields) in each row are separated by commas or tab characters, and each row ends with a carriage return (enter). If necessary, start the spreadsheet application and use the File Open command to select the desired file, then (if prompted) indicate that the fields in each record (line) are separated by commas (or tabs). The data should then appear in columns in your spreadsheet.

Bluehill® test files (CSV formatted ASCII)

Each Bluehill® test will yield one data file containing header information and logged data from the test. An example is given below. The filename is entered prior to the test (see Appendix B). The header information typically contains test and specimen identification parameters. Other pertinent data are often included in the header from before, during, and after the test. After the header information, the file will contain logged information, such as the crosshead position, load, strain, and time, recorded at the time interval programmed into the test method used. Note that the file format and the content recorded are customized for this facility and for the testing being performed.

Here is an example data file (C4C1045NM.csv) from a load frame tension test:

```
Course,"CEE 300"
Lab Section Number,"4"
Test Group,"C"
Type of Test,"Tensile - Round"
Crosshead Rate,4.00,mm/min
Start Date,9/14/2011 10:47 AM
End Date,9/14/2011 10:50 AM
Material,"1045 Steel"
Heat treatment,"Normalized"
Other information,""
Geometry,Circular
```

←Header start in ASCII format

Downloading Data

Diameter,7.10,mm
Area,39.5919,mm^2
Hardness,90.9
Rockwell Scale,HRB
Grip Diameter (Hardness correction),12.56,mm
Gage Length (Extensometer),25.40,mm
Maximum Load,30150,N
Tensile strain at Maximum Load,0.1328,mm/mm
Tensile strain at Maximum Strain 1,0.2813,mm/mm
Load at Maximum Strain 1,23130,N
Fracture Type and Location,""
Final Diameter,6.00,mm
Notes During Test,""

Time,Extension,Load,Strain 1
(sec),(mm),(N),(mm/mm)

← Column headings & units

0.00,0.00,-149.6,-0.00002
0.50,0.03,351.9,0.00004
1.00,0.07,1231,0.0001381
1.50,0.10,1906,0.0002231
2.00,0.13,2413,0.0002972
2.50,0.17,2782,0.0003415
3.00,0.20,3111,0.0003903
3.50,0.23,3451,0.0004335
4.00,0.27,3782,0.0004742
4.50,0.30,4107,0.0005271
5.00,0.33,4419,0.0005463
5.50,0.37,4714,0.0005958

← Data in ASCII format

,,
,,
,,

119.50,7.97,30140,0.1269
120.00,8.00,30140,0.1279
120.50,8.03,30140,0.1289
121.00,8.07,30140,0.1299
121.50,8.10,30150,0.1308
122.00,8.13,30140,0.1318
122.50,8.17,30150,0.1328
123.00,8.20,30150,0.1338
123.50,8.23,30150,0.1348
124.00,8.27,30150,0.1358
124.50,8.30,30140,0.1369
125.00,8.33,30140,0.1379
125.50,8.37,30140,0.1389
126.00,8.40,30140,0.1400
126.50,8.43,30140,0.1410
127.00,8.47,30140,0.1421
127.50,8.50,30130,0.1431
128.00,8.53,30130,0.1442
128.50,8.57,30120,0.1452
129.00,8.60,30120,0.1463

← Maximum load

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176.50,11.77,24320,0.2710
177.00,11.80,24160,0.2725
177.50,11.83,24000,0.2739

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```
178.00,11.87,23840,0.2754
178.50,11.90,23670,0.2768
179.00,11.93,23500,0.2784
179.50,11.97,23320,0.2798
180.00,12.00,23130,0.2813
180.36,12.02,12540,0.2683 ← End of record (specimen fractured)
```

Instron® CEAST® VisualIMPACT® test files (CSV formatted ASCII)

Impact testing in this lab facility employs VisualIMPACT® software. A separate header and data file are recorded for each test in CSV formatted ASCII. The header and data file names will be similar e.g. C04-CD-1045-RT.csv header file name, as entered at the start of the test, and C04-CD-1045-RT_1_Spec_1_Ch_1.csv data file name generated after the test. This separate header and data file scheme is also employed in this lab with LabVIEW® data files, which are described next.

LabVIEW® test files (tab delimited ASCII)

In general, two files hold the LabVIEW® test data for each individual test. Examples are given below. The filenames begin with the filename entered into LabVIEW® at the time of the test (see Appendix B). The header file typically contains test and specimen identification parameters. The data file typically contains logged information, such as position and load, recorded at the time interval requested, or it may contain entries that have been manually keyed in. Note that the file formats and the content recorded are customized for this facility and for the testing being performed. Note: An asterisk (*) has historically been placed on the first line of the data file for compatibility with Cricket Graph, an older graphing software package for Macintosh computers.

Header file

The suffix "h" appended to the designated filename identifies the header file. This file contains the identifiers and data input from the various panels in LabVIEW®. Other pertinent data are typically included from before, during, and after the test. Here is a sample header file from the custom torsion-testing machine in the lab, named C03CD1045_h.txt:

```
Program:      Torsion
Filename:     C03CD1045
Course/Sect:  CEE300-03
Date:        Tue, Sep 28, 2010
Time:        1:45 PM
Material:     1045 Steel
Specimen Info: Normalized
Diameter:    16.010      mm
Cross Sect. Area: 201.313      mm^2
Polar moment (J): 6450.082      mm^4
Encoder Cycles Per Revolution: 2048
Quadrature Mode: x4
Quadrature Cycles Per Revolution: 8192
Encoder Gage Length: 70.000      mm
Encoder Shaft Diameter: 6.350      mm
Data Interval: 0.500      sec
Max Torque: 483.0000      N-m
Final Diameter: 115.99      mm
```

Data file

The same designated filename as the above example with the suffix “d” appended to it identifies the data file. Here is the companion data file to the above example header file, named C03CD1045_d.txt:

```

*
Twist/length(rad/m) Torque (N-m) Time (seconds)
0.000E+0 -5 0.000E+0
0.000E+0 -5 454.000E-3
0.000E+0 -5 954.000E-3
0.000E+0 -5 1.454E+0
0.000E+0 -5 1.954E+0
0.000E+0 -5 2.454E+0
0.000E+0 -5 2.954E+0
0.000E+0 -5 3.454E+0
8.692E-3 -4 3.954E+0
17.383E-3 -1 4.454E+0
17.383E-3 -1 4.954E+0
17.383E-3 -1 5.454E+0
21.729E-3 1 5.954E+0
30.421E-3 4 6.454E+0
34.767E-3 6 6.954E+0
34.767E-3 8 7.454E+0
39.113E-3 9 7.953E+0
39.113E-3 11 8.454E+0
47.804E-3 13 8.954E+0
47.804E-3 14 9.454E+0
52.150E-3 16 9.954E+0
56.496E-3 17 10.453E+0
60.842E-3 17 10.954E+0
60.842E-3 18 11.454E+0
69.534E-3 19 11.954E+0
69.534E-3 20 12.453E+0
73.879E-3 20 12.954E+0
78.225E-3 21 13.454E+0
78.225E-3 21 13.953E+0
82.571E-3 22 14.454E+0
86.917E-3 23 14.953E+0
, , ,
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, , ,
88.351E+0 480 271.454E+0
88.620E+0 480 271.954E+0
88.851E+0 480 272.454E+0
89.120E+0 480 272.954E+0
89.394E+0 480 273.454E+0
89.668E+0 480 273.954E+0
89.937E+0 481 274.454E+0
90.207E+0 481 274.954E+0
90.467E+0 481 275.454E+0
90.741E+0 481 275.954E+0
90.919E+0 481 276.454E+0
91.180E+0 481 276.954E+0
91.454E+0 481 277.454E+0
91.736E+0 482 277.954E+0
    
```

←Cricket Graph flag
 ←Column headings, units
 ←Data in ASCII format

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92.006E+0	482	278.454E+0	
92.284E+0	482	278.954E+0	
92.558E+0	482	279.454E+0	
92.836E+0	482	279.954E+0	
93.114E+0	482	280.454E+0	
93.401E+0	482	280.954E+0	
93.688E+0	482	281.454E+0	
93.975E+0	482	281.954E+0	
94.257E+0	482	282.454E+0	
94.540E+0	482	282.954E+0	
94.613E+0	483	283.454E+0	← Maximum torque
94.887E+0	483	283.954E+0	
95.183E+0	483	284.454E+0	
95.483E+0	483	284.954E+0	
95.787E+0	483	285.454E+0	
96.087E+0	482	285.954E+0	
96.400E+0	482	286.454E+0	
96.721E+0	481	286.954E+0	
97.077E+0	475	287.454E+0	
98.116E+0	-3	287.954E+0	← End of record (specimen fractured)

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