

Data Mining in Autocad with Data Extraction

Ben Rand

Director of IT, Job Industrial Services, Inc.

Twitter: @leadensky

Email: ben@leadensky.com

A little about me

- BA in English, Secondary Ed emphasis, Minor in French
- Technical writing: Published books on Excel, various other tech topics
- Started working with Autocad in R12 for Windows (Architecture)
 - Learned LISP, VBA to automate boring drafting tasks
 - ATC instructor: Autocad, 3DS, VBA/LISP for Autocad
- CAD Manager in Industrial Engineering starting in 2002
- Currently:
 - Full-time development using C#
 - IT stuff: servers, network, VMWare, helpdesk
 - Autocad All-Star Mentor Program
 - Taught at AU 2015 (development topic)



Welcome to AU 2016

First class at AU:



Last class at AU:



Class summary

Your drawings are a potential gold mine of information. Learn how to get the most out of your AutoCAD drawings using the powerful Data Extraction tool. Learn how to build automated bills of material, drawing title sheets, coordinate tables and more. Learn how to extract data to AutoCAD software tables or Microsoft Excel files. This session features AutoCAD.

Key learning objectives

At the end of this class, you will be able to:

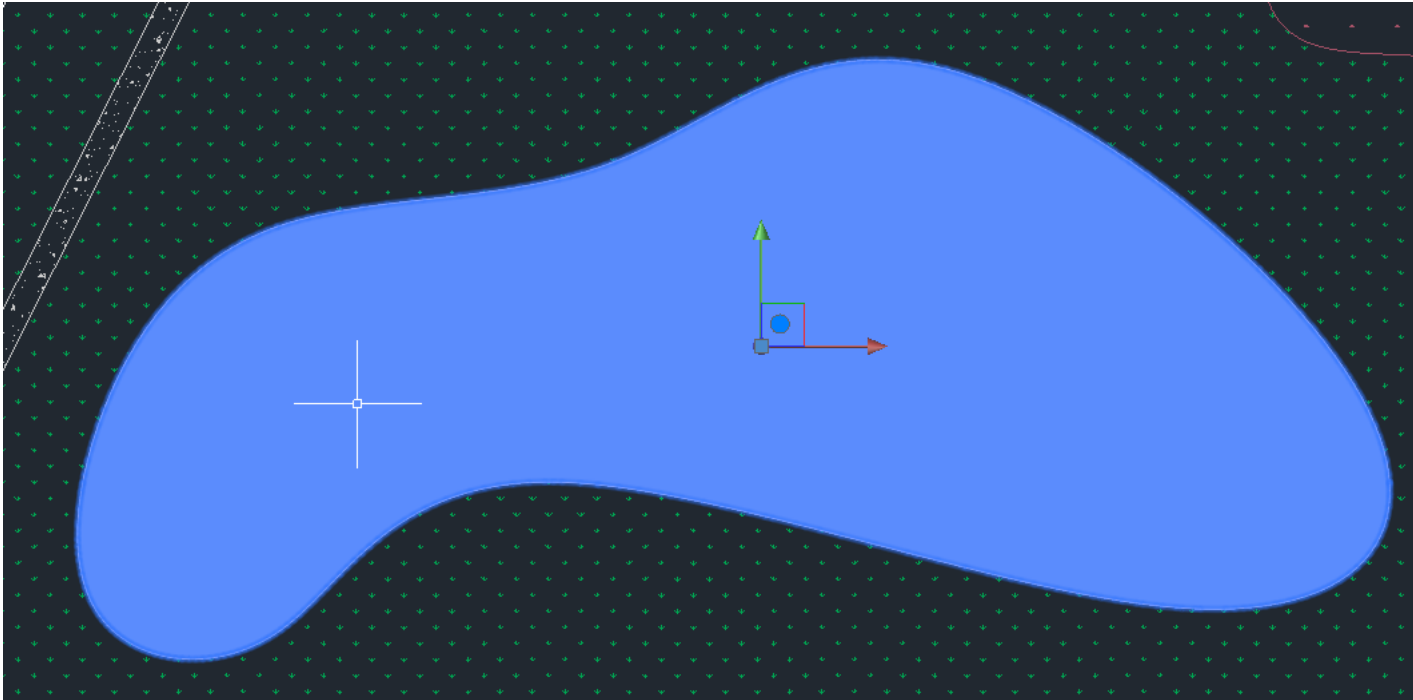
- Learn how to use Data Extraction to create tables based on drawing data
- Learn how to use Data Extraction to extract data across multiple drawings
- Learn how to link Excel spreadsheets with extracted data
- Learn how to customize data extraction using sorting, filtering, formulas, and totals

DEMO: Some ways to get “transient” information

- LIST
- PROPERTIES
- QSELECT
- SELECTSIMILAR
- *Insert Field** [annotations]
 - *fields are a form of “persistent” data extraction

A DWG file is a *Database* that displays most of its information graphically

- (entget (car (entsel)))



```
(  
  (-1 . <Entity name: 20b64af3af0>)  
  (0 . "HATCH")  
  (330 . <Entity name: 20b5cb53b70>)  
  (5 . "3497")  
  (100 . "AcDbEntity")  
  (67 . 0)  
  (410 . "Model")  
  (8 . "Pond")  
  (100 . "AcDbHatch")  
  (10 0.0 0.0 0.0)  
  (210 0.0 0.0 1.0)  
  (2 . "SOLID")  
  ...omitted for brevity  
  (10 1843.11 4065.32 0.0)  
  (10 1639.84 3993.86 0.0)  
  (10 1408.53 3663.38 0.0)  
  (10 1362.56 3122.96 0.0)  
  (10 1893.4 3059.48 0.0)  
  (10 2198.11 3740.44 0.0)  
  (10 4078.28 3007.36 0.0)  
  (10 4533.49 3595.95 0.0)  
  (10 3176.75 4695.56 0.0)  
  (10 2628.12 4092.16 0.0)  
  (10 2046.37 4136.78 0.0)  
  (10 1843.11 4065.32 0.0)  
  (97 . 0)  
  (97 . 1)  
  (330 . <Entity name: 20b64af8c30>)  
  ...omitted for brevity  
  (63 . 2)  
  (421 . 16776960)  
  (470 . "LINEAR")  
)
```

What versions of Autocad have the Data Extraction command?

- Data Extraction requires FULL Autocad, sorry LT users!



- Introduced in Autocad with 2008 version
 - Any “vertical” based on Autocad
 - NOTE: “vertical”-specific data may not be extractable via Data Extraction

Data Extraction: “Persistent” information (but updateable!)

- Most geometrical data
 - Coordinates (x, y, z locations)
 - Length (lines, polylines, etc)
 - Area (closed polylines, hatches, circles, etc)
 - Text: content and rich text format content (Mtext)
- Blocks
 - Attributes
 - Dynamic block properties
- File properties
 - Name
 - Size, etc.

What can we extract to?

- Table in the drawing
- Excel file (xls)
 - No, not directly to xlsx <sigh>
 - No, not to a selected template <sigh>
 - *Can* be linked to an existing xls or xlsx file
- Text file (txt, csv)
- Access (mdb)

Best Practices for Data Extraction

- Use blocks!
 - Attributes
 - Dynamic blocks
 - #NeverExplode
- Good layering scheme
 - Layer names represent *function*, not appearance!
 - Should enable you to effectively filter parts of your drawing (i.e. freeze/thaw FURNITURE easily)

DEMO: Extracting Room Schedule Data

- Use Data Extraction wizard to create table of attribute data
- Use Block Editor to add an attribute to an existing block
- Edit Data Extraction settings to update a table

DEMO: Extracting Quantity Take-Offs

- Use Data Extraction to create table of block quantities
- Update table after design change
- Scaling tables for presentation (plotting)



BREAK: Stand up and Stretch for 30 seconds...GO!

DEMO: Overriding Extracted Values

- Use Data Extraction to create table of extracted coordinate data
- Rename and organize columns
- Override cell values

DEMO: Customize Data Extraction with Sorting, Filtering Formulas and Totals

- Use Data Extraction based on object properties (Area)
- Summarize data
- Format data
- Filter data
- Add totals

DEMO: Extract Data across multiple drawings

- Use Data Extraction to create an Index to Drawings using title block attributes from multiple drawings
- Add folder of drawings, with wild-card matching
- Create a new drawing, and update Index table

DEMO: Link Excel data to a table

- Create a Data Link
- Create a table using a Data Link
- Resizing rows and columns
- One-way and two-way data with Excel

DEMO: Combine Autocad and Excel Data

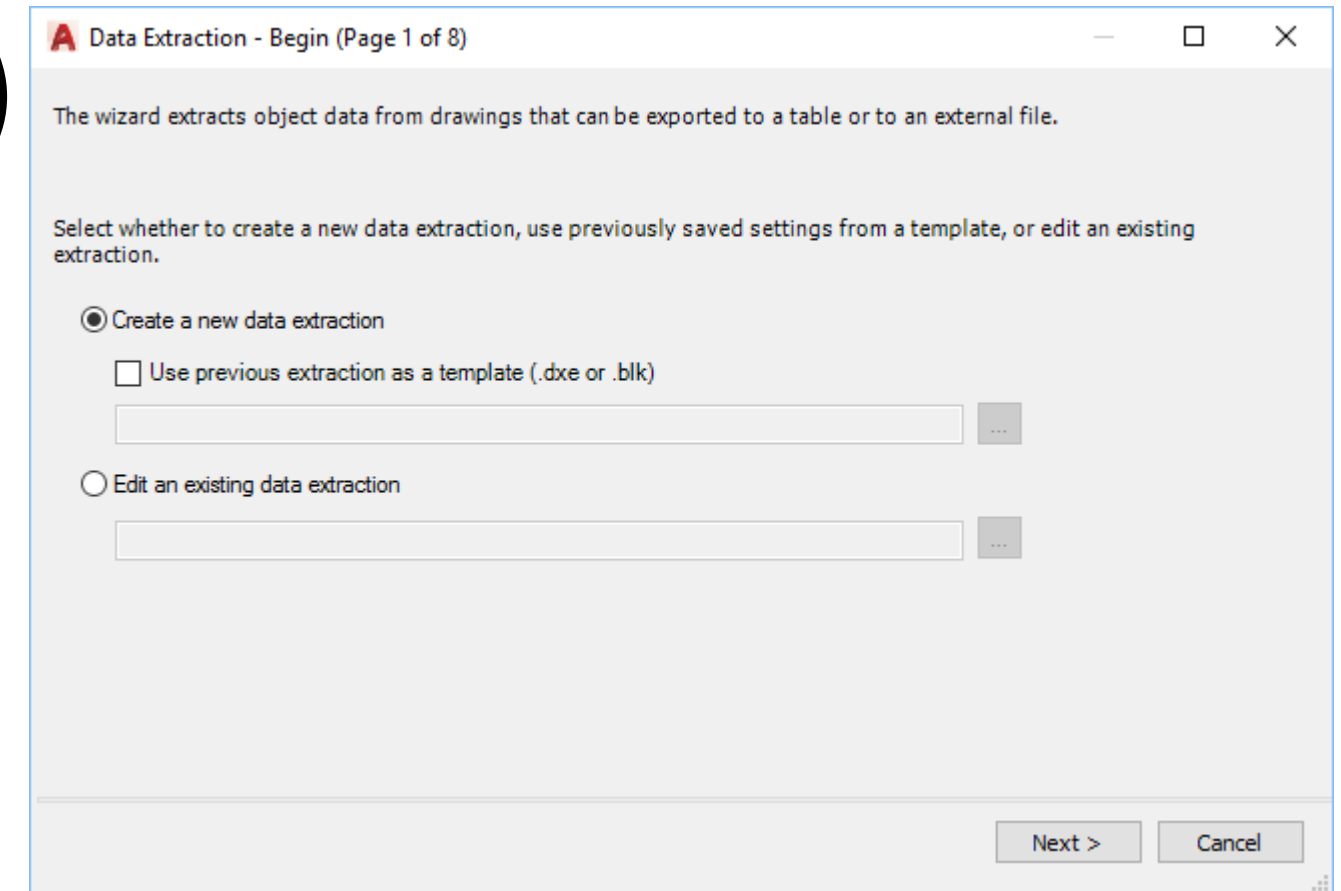
- Use Data Extraction combined with Data Link to create a “combined” table
- Use “key” from extracted (Autocad) data to link to “key” in Excel

DEMO: Custom Detail Bill of Materials

- Use Data Extraction to create a “combined” bill of materials from different details

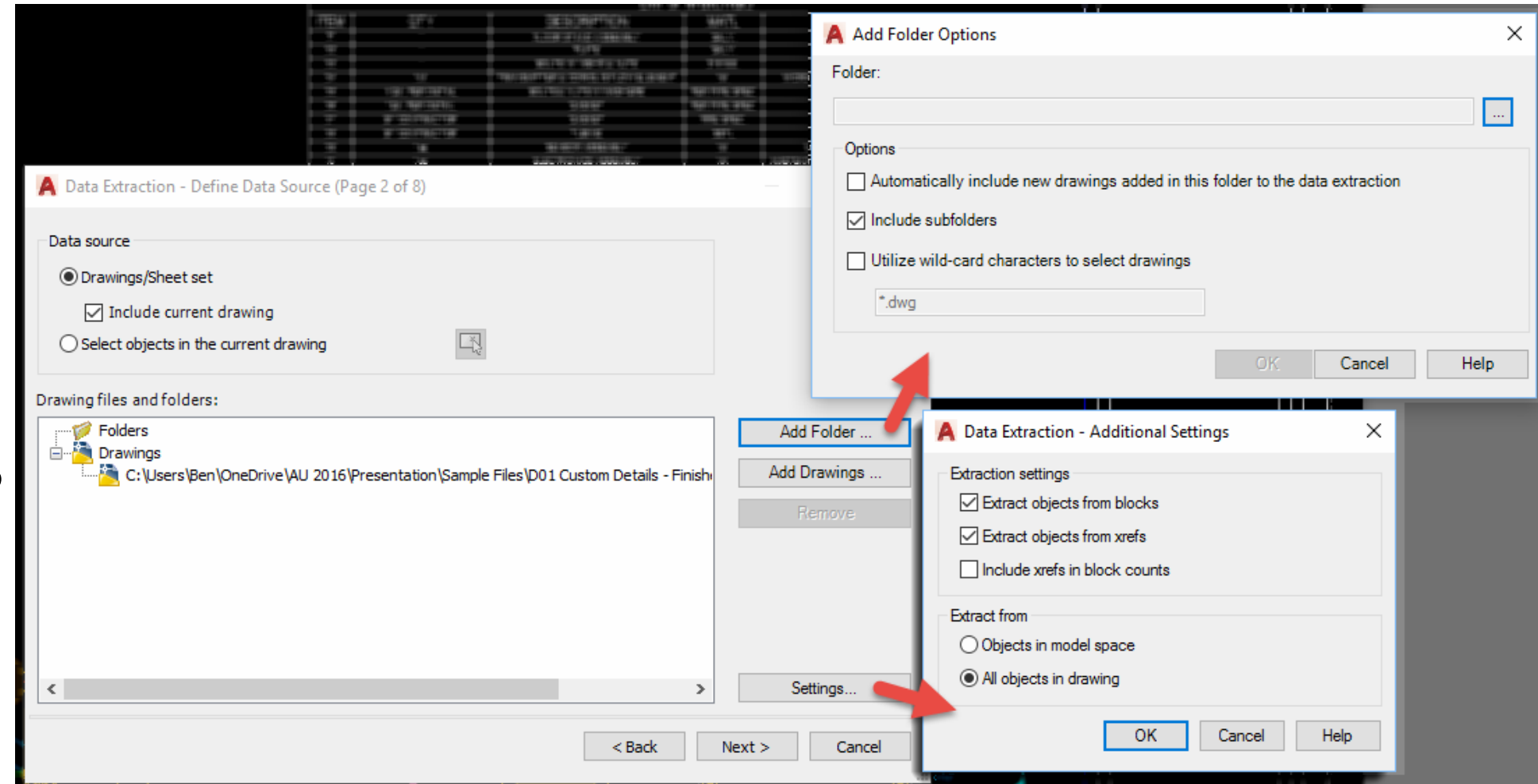
Data Extraction Wizard (step 1)

- New data extraction file (dxe) from scratch or using a “template”
- Edit an existing dxe



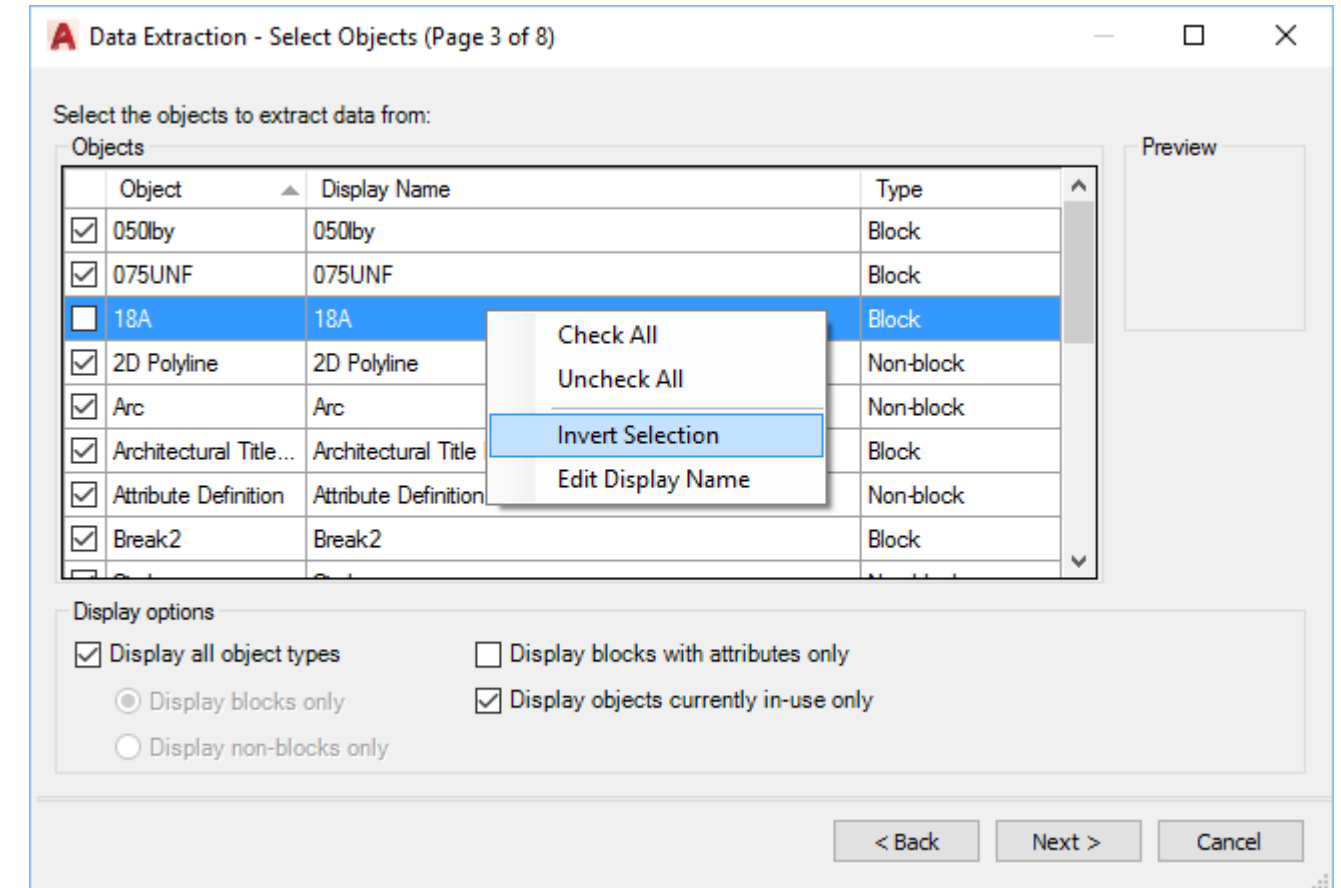
Data Extraction Wizard (step 2)

- Add multiple drawings, or folders
- Constrain to specific objects
- Extract from blocks/xrefs (or not)



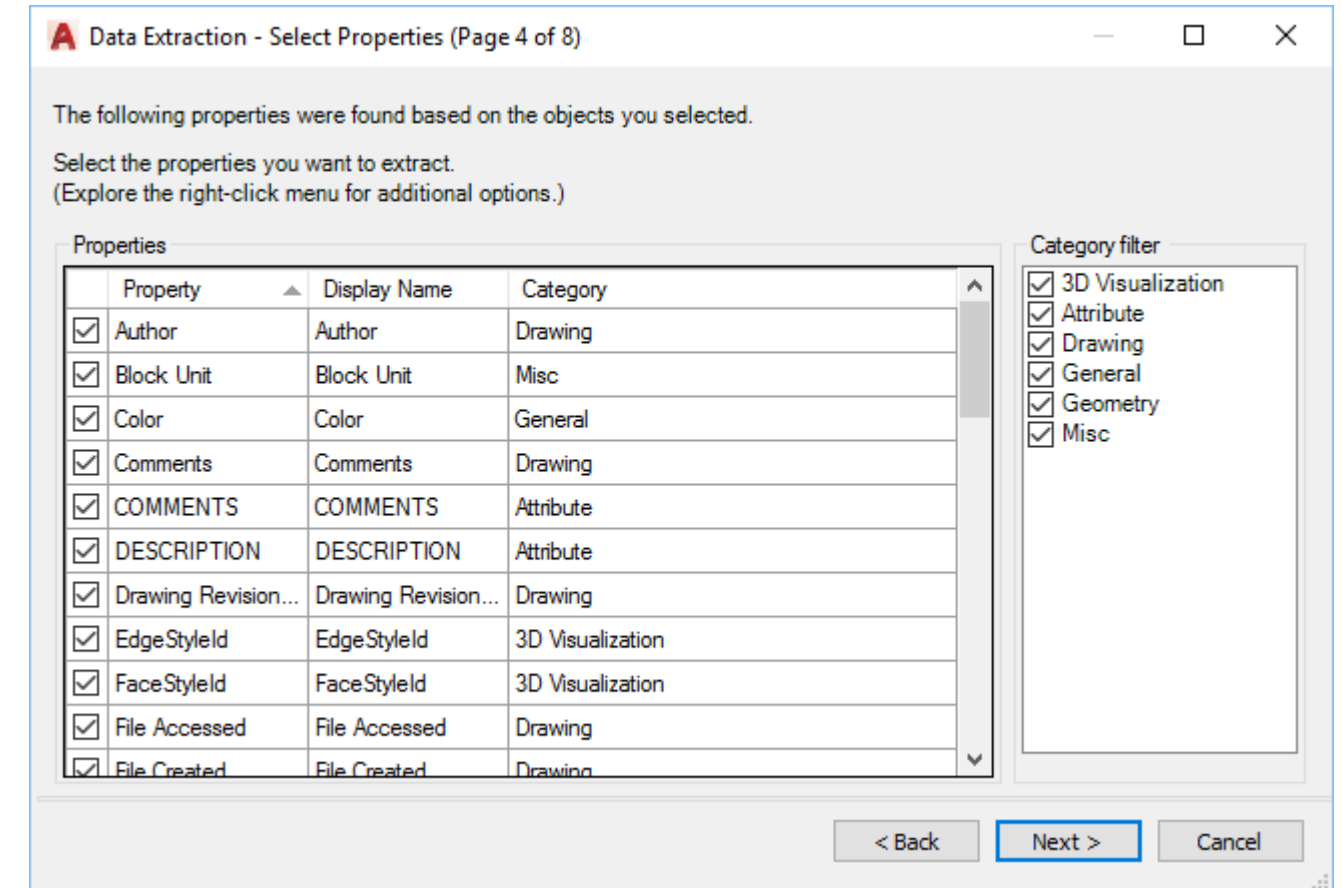
Data Extraction Wizard (step 3)

- Choose what to extract data from
- Objects, blocks



Data Extraction Wizard (step 4)

- Select properties to extract
- Geometry
- General (layers, color, etc)
- Attributes
- Drawing (file name, size, etc)
- *Category list may change based on object properties



Data Extraction Wizard (step 5)

- Structure of output
 - Column name, order
 - Data format
 - Formula columns
 - Filtering
 - Totals
- Link with Excel
- Sorting

The image displays three overlapping screenshots of the Autodesk Data Extraction Wizard interface, specifically step 5. The main window, 'Data Extraction - Refine Data (Page 5 of 8)', shows a table with columns: Count, Name, Author, Block Unit, Color, and Comments. A context menu is open over the 'Name' column, offering options like 'Sort Descending', 'Sort Ascending', 'Rename Column', 'Hide Column', and 'Link External Data...'. Below the table, there are checkboxes for 'Combine identical rows', 'Show count column', and 'Show name column'. To the right, the 'Link External Data' dialog is open, showing options for 'Data link' (set to 'None') and 'Data matching' (with 'Drawing data column' and 'External data column' dropdowns). Below this, the 'Sort Columns' dialog is visible, showing a table with 'Column' and 'Order' headers, with 'Select column' and 'Ascending' selected. At the bottom, the 'Data Extraction - Full Preview' window shows a preview of the extracted data table.

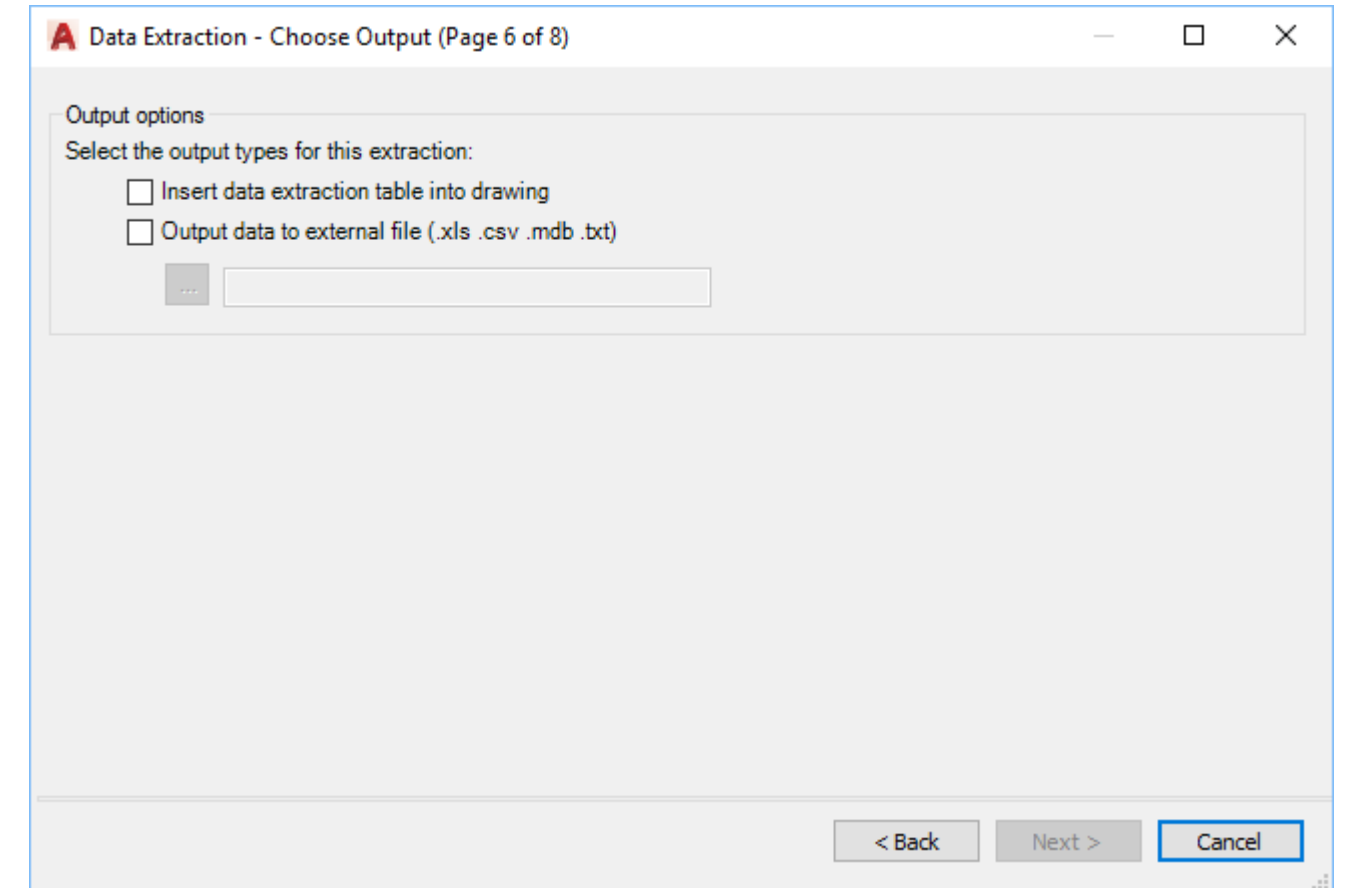
Count	Name	Author	Block Unit	Color	Comments
1	InstrumentCallout			ByLayer	
1	InstrumentCallout			ByLayer	
1	InstrumentCallout			ByLayer	
1	InstrumentCallout			ByLayer	
1	InstrumentCallout			ByLayer	
1	InstrumentCallout			ByLayer	

Column	Order
Select column	Ascending

Count	Name	Author	Block Unit	Color
1	InstrumentCallout...		Inches	ByLayer
1	InstrumentCallout...		Inches	ByLayer
1	InstrumentCallout...		Inches	ByLayer
1	InstrumentCallout...		Inches	ByLayer
1	InstrumentCallout...		Inches	ByLayer
1	InstrumentCallout...		Inches	ByLayer
1	InstrumentCallout...		Inches	ByLayer

Data Extraction Wizard (step 6)

- Output destination
 - Table in drawing
 - External file
 - XLS
 - TXT
 - CSV
 - MDB



Data Extraction Wizard (step 7)

- Table and cell styles
- Title
- Column headers

Data Extraction - Table Style (Page 7 of 8)

Table style
Select the table style to use for the inserted table:

Standard

Formatting and structure

☐ Use table in table style for label rows

☒ Manually setup table

Enter a title for your table:

<Title>

Title cell style: Title

Header cell style: Header

Data cell style: Data

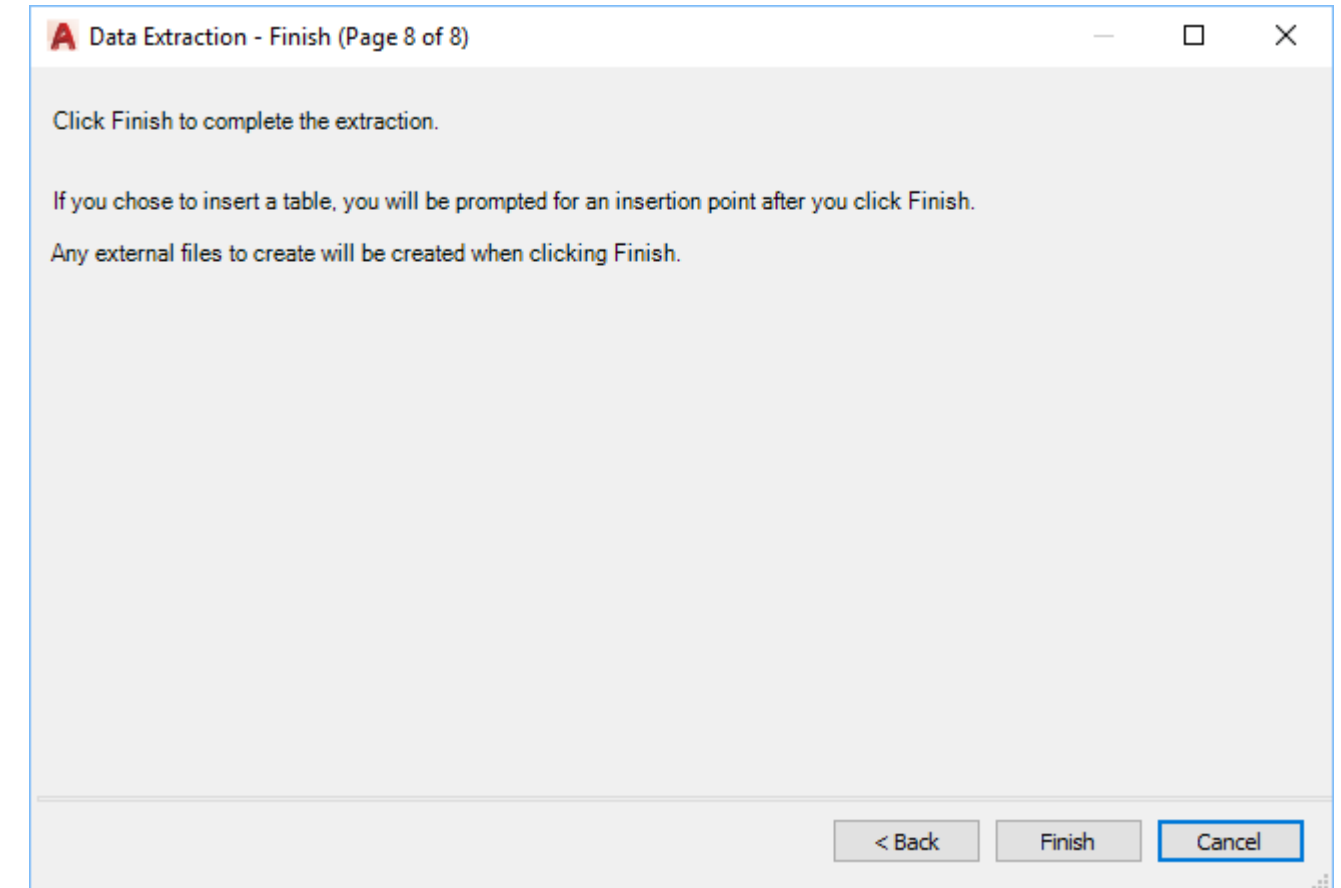
☒ Use property names as additional column headers

Title	
Header	Header
Data	Data
Data	Data
Data	Data
Data	Data
Data	Data
Data	Data

< Back Next > Cancel

Data Extraction Wizard (step 8)

- ...the end?

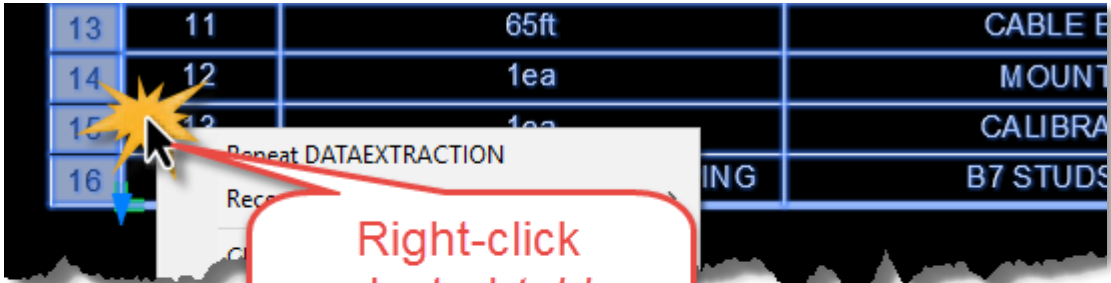


Updating Data Extraction Table



Right-click selected cell

- Borders...
- Locking
- Data Format...
- Match Cell
- Remove All Property Overrides
- Data Extraction
 - Update Data Extraction
 - Edit Data Extraction Settings...
 - Detach Data Link
- Insert
- Edit Text



Right-click selected table

- Repeat DATAEXTRACTION
- Rec...
- Table Indicator Color...
- Update Table Data Links
- Write Data Links to External Source

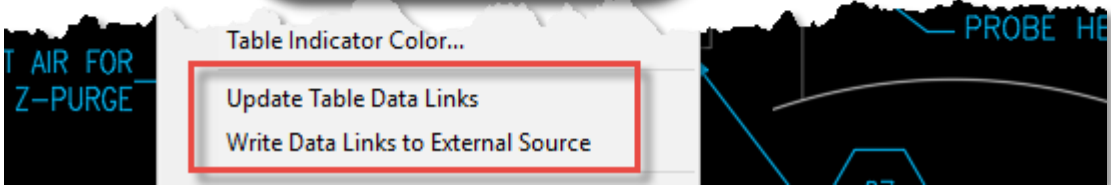


Table Indicator Color...

- Update Table Data Links
- Write Data Links to External Source

Other Resources

- Combining Autocad Data Extraction Tables with Excel – The CAD Geek: <https://www.youtube.com/watch?v=QLGoxHMg8Zw>
- Data Extraction Wizard – Autocad Help: <https://knowledge.autodesk.com/support/autocad/learn-explore/caas/CloudHelp/cloudhelp/2016/ENU/AutoCAD-Core/files/GUID-D1433C93-0E7F-46D0-8D05-78DF3626B146-htm.html>
- Google: Autocad Data Extraction

How did I do?

- Your class feedback is critical. Fill out a **class survey** now.
- Use the AU mobile app or fill out a class survey online.
- Give feedback after each session.
- AU speakers will get feedback in real-time.
- **Your feedback results in better classes and a better AU experience.**



Contact Info

- ben@leadensky.com
- Ben Rand
- Twitter: @leadensky

