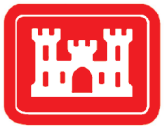
ERDC/ITL SR-20-14



US Army Corps
of Engineers®
Engineer Research and
Development Center

The CAD/BIM Technology Center
for facilities, infrastructure, and environment

USACE BIM Object Library User Guide

Release 1.0

September 2020

The USACE BIM Object Library User Guide is a resource that is a supplement to the USACE BIM Object Library which is a content management system. The guide enables the users to have a more efficient experience while utilizing the USACE BIM Object Library. The guide defines procedures for users to perform general and precise user defined searches.

Information Technology Laboratory

The U.S. Army Engineer Research and Development Center (ERDC) solves the nation's toughest engineering and environmental challenges. ERDC develops innovative solutions in civil and military engineering, geospatial sciences, water resources, and environmental sciences for the Army, the Department of Defense, civilian agencies, and our nation's public good. Find out more at www.erdc.usace.army.mil.

To search for other technical reports published by ERDC, visit the ERDC online library at http://acwc.sdp.sirsi.net/client/default.

The CAD/BIM Technology Center
for facilities, infrastructure, and
environment

ERDC/ITL SR-20-14
September 2020

USACE BIM Object Library User Guide

Release 1.0

U.S. Army Engineer Research and Development Center (ERDC)
Information Technology Laboratory (ITL)
3909 Halls Ferry Road Vicksburg, MS 39180-6199

Prepared for U.S. Army Engineer Research and Development Center
Vicksburg, MS 39180-6199

Under Project Element Number 4902-XX-2460-08
Project Number K6HK65

Abstract

The U.S. Army Corps of Engineers (USACE) is in need of a centralized repository of standardized Building Information Modeling (BIM) Objects. This repository is needed to serve as the BIM Object Library to be utilized by architects and engineers on architectural and engineering federal design projects. The U.S. has more than 109,000 registered architects and 820,000 licensed professional engineers that could potentially have access to this BIM Object Library. The CAD/BIM Technology Center has currently harvested more than 8,500 BIM Objects from USACE districts. It is expected that the USACE BIM Object Library will grow to more than 35,000 BIM Objects based on the existing content being managed by each individual USACE district.

The CAD/BIM Technology Center's research shows that the content management system solution needs to provide BIM objects that contain all the information required to design, find, locate, specify, interrogate, and analyze the represented product. The study also shows the solution should provide an intuitive interface which allows users to easily retrieve the BIM objects that meet a set of user defined criteria. Furthermore, the solution should verify the BIM Objects selected for inclusion into the USACE BIM Object Library comply with the advanced modeling object standard. Finally, the study shows that the solution should be capable of efficiently and effectively managing and querying at least 5 million parameters and associated values.

Contents

Figures

Preface

This study was conducted for the USACE Headquarters under Project Number K6HK65, "USACE BIM Object Library." The technical monitor was Mr. Andrew H. Ross.

The work was performed by the Computer Aided Design/Building Information Modeling Technology Center of the Software Engineering and Informatics Division (SEID), U.S. Army Engineer Research and Development Center, Information Technology Laboratory (ERDC-ITL). At the time of publication, Mr. Edward L. Huell Jr. was the Chief of the CAD/BIM Technology Center, Mr. Quincy G. Alexander was the Acting Chief of the SEID, Ms. Patti S. Duett was the Deputy Director of ITL, and Dr. David A. Horner was the Director of ITL.

The Commander of ERDC was COL. Teresa A. Schlosser and the Director of ERDC was Dr. David W. Pittman.

1 Introduction

1.1 Scope

The U.S. Army Corps of Engineers (USACE) is in need of a centralized repository to manage potentially tens of thousands of standardized Building Information Modeling (BIM) Objects, so that objects can be utilized by architects and engineers on federal design projects. In response to this need, the USACE BIM Object Library (UBOL) was developed.

The mission of the UBOL is to provide USACE architects, engineers, and BIM users with a resource that has a catalog of standardized building information modeling objects that can be readily input into a building information model during the design phase of a construction project.

This enterprise-level solution provides content that is sanitized, standardized, vetted, and organized in a centralized repository. This content management solution provides users the ability to access content that has been developed within any part of the USACE enterprise by the users defining specific or general search criteria. This solution also provides the USACE with a better method of managing large volumes of BIM Objects from across its enterprise and provides a mechanism for USACE to utilize when updating enterprise content with current architecture, engineering, and construction industry standards.

1.2 Purpose

This UBOL User Guide is intended to be a resource that will increase the effectiveness of user defined searches. Thereby, increasing the user efficiency while utilizing the USACE BIM Object Library. The guide will better equip users to find specific content without prolonged use of valuable time and effort. The guide defines recommended workflows to perform searches that will yield prudent search results based on the needs of the user. It defines a workflow with an approach that will yield general search results and also defines an approach that will produce more specific search results. The workflow that produces general search results is more suited to the novice BIM user, whereas the workflow which produces the more specific search results is geared towards the more experienced BIM user.

1.3 Process overview

This content management system allows users to search for content from across the USACE enterprise based on the user defined search criteria. Users are able to compare the details of multiple BIM objects side-by-side, and select which BIM Objects they want to download for use in their design projects.

The CAD/BIM Technology Center recommends either of the two search methods indicated below to be used when performing searches within the UBOL. Users with a beginner's knowledge level of BIM may find it more user friendly to perform searches via the Workflow "A" method, while the more advanced users of BIM may find it more user friendly to perform searches via the Workflow "B" method.

- Workflow "A" – a generalized search method
- Workflow "B" – a refined search method

2 Workflow "A"

2.1 Workflow description

Workflow "A" is a search method that users can utilize when general search results are desired. This method does not require a knowledge of the assigned category for the object that is being sought by the user. Users can also refine the search by entering a keyword into the search engine.

2.2 Step 1

To search the entire repository, select "No Category."

- Procedures for Step 1
  - Click the pull-down menu that is for the category bar (Figure 1).
  - Click on "No Category."
  - Wait approximately 15 – 30 sec for the content to populate.

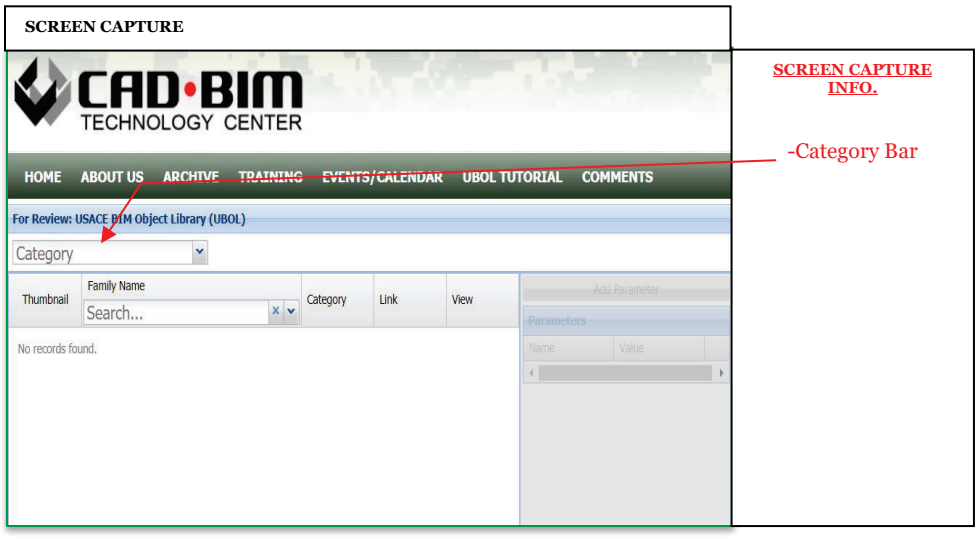


Figure 1. Screen capture that identifies the location of the category bar.

2.3 Step 2

To refine the search, enter a keyword.

- Procedures for Step 2
  - In the search bar, enter a keyword to refine the search (Figure 2).
  - Wait approximately 5 – 15 sec for the content to populate

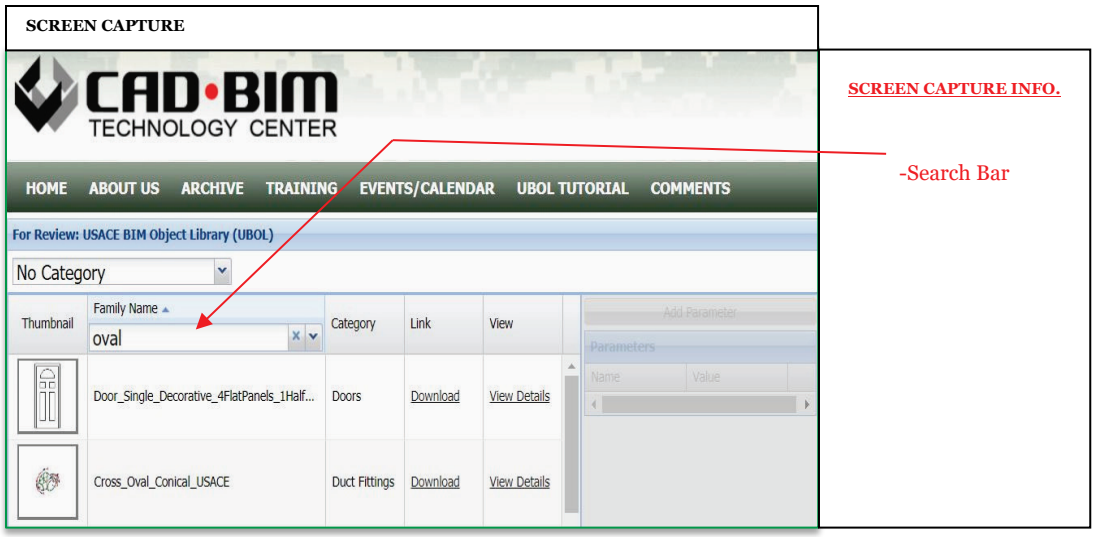


Figure 2. Screen capture that identifies the location of the search bar.

2.4 Step 3

This step allows the user to review search results by scrolling through the general information associated with the objects yielded from Steps 1 and 2.

- Procedure for Step 3
  - Place the cursor in the results window (Figure 3).
    a. If the search yielded too many BIM Objects, but the user is now able to determine the desired BIM Objects category, the user should now begin searching utilizing the Workflow “B” method.
  - Scroll up and down to review results.

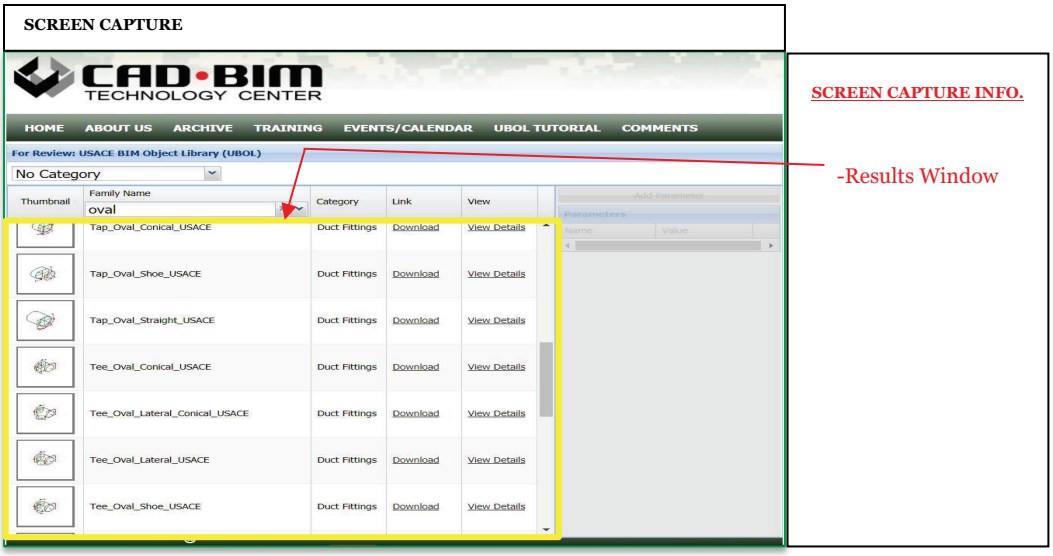


Figure 3. Screen capture that identifies the location of the results window.

2.5 Step 4

Viewing BIM object specific details allows the user to open a new window and view many parameters and values associated with the selected BIM object.

- Procedure for Step 4
  - Click on "View Details" of a BIM Object to see more information about the object or double click on the name of the object (Figure 4).

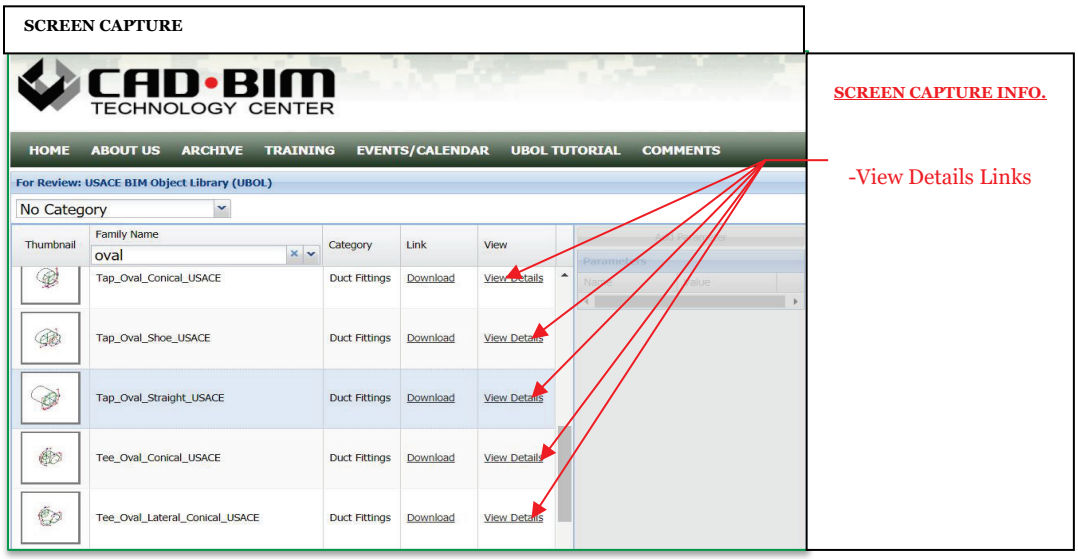


Figure 4. Screen capture that identifies the locations of the view details links. Users can click the "View Details" links of multiple BIM Objects in order to open multiple windows and compare objects side by side.

2.6 Step 5

Reviewing the Detail Information Page allows the user to review all captured information associated with a given BIM Object. The user can scroll horizontally to view all data associated with the particular object.

- Procedure for Step 5
  - Use the horizontal scroll bar to view all parameters and values associated with the selected BIM Object (Figure 5).

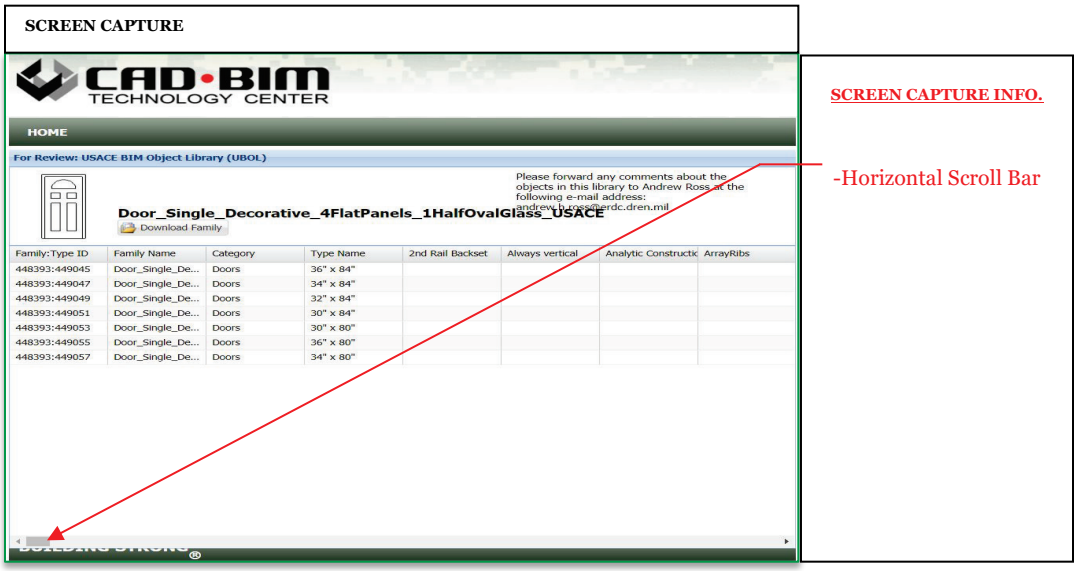


Figure 5. Screen capture that identifies the location of the horizontal scroll bar.

2.7 Step 6

Downloading Content allows the user to have the desired content on their workstation after reviewing the search results.

- Procedures for Step 6
  - Identify the BIM Objects to download.
  - Click the download button for each BIM Object that is desired to be downloaded (Figure 6).

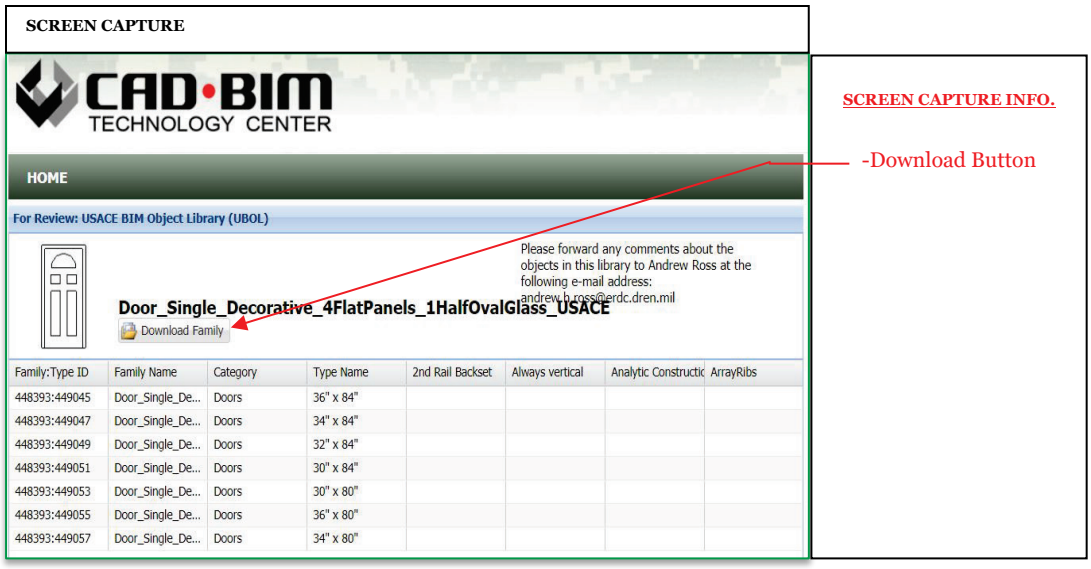


Figure 6. Screen capture that identifies the location of the download button.

3 Workflow "B"

3.1 Workflow Description

Workflow "B" is a searching method that users can utilize when more refined search results are desired. This method does require a better understanding of how BIM Objects are organized in the native authoring software tools. Also, a working knowledge of the desired characteristics of the object being sought equips the user to perform the refined searches based on user specified criteria.

3.2 Step 1

Selecting a "category" allows the user to scroll and browse all available objects in a particular category. Users are then able to browse all available objects of the selected category in the results window (Figure 7).

- Procedures for Step 1
  - Click on the pull-down menu for the category bar (Figure 7).
  - Click on the "desired category."
  - Wait approximately 15– 30 sec for the content to populate.

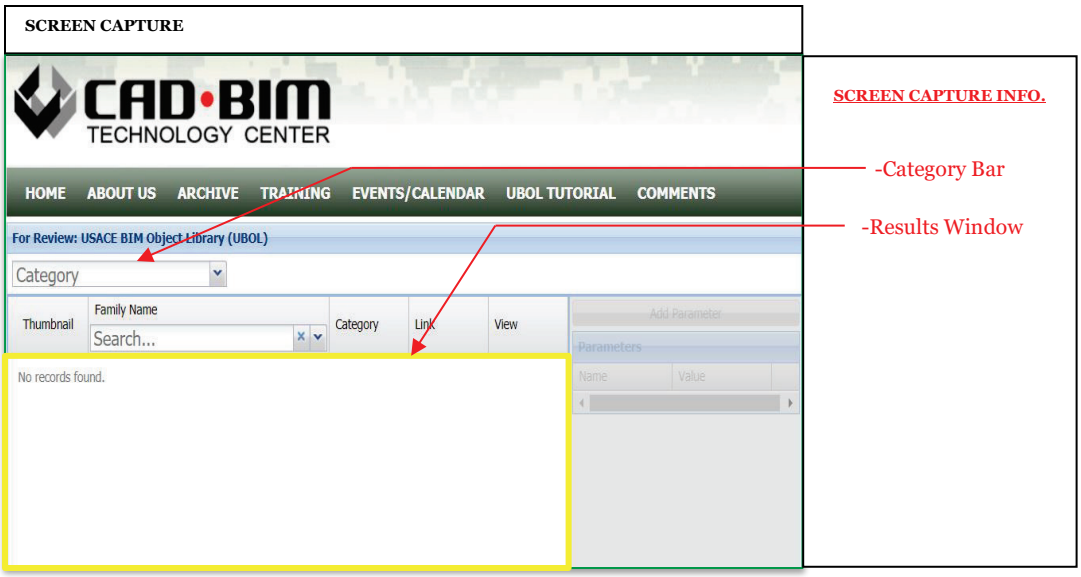


Figure 7. Screen capture that identifies the location of the category bar and the results window.

3.3 Step 2

Refining the search by identifying parameters allows the user to specify search criteria, which will in eliminate objects that do not meet the identified criteria (Figures 8 and 9). Parameters may include things such as width, height, depth, assembly code, fire rating, material, function, etc.

- Procedures for Step 2
  - Click on the "Add Parameter" button (Figure 8).
  - Select one or more parameters from the dialogue box (Figure 9).
  - Then, click on the "Add Params" button at the bottom of the dialogue box (Figure 9).
  - Next, select a value for each selected parameter.
    a. Click on select value (Figure 10).
    b. Click on the 3 dots button (Figure 11).
    c. Select one value from the "Select value" dialogue box.
    d. Then, click the "Select Value" button (Figure 12).
    e. Repeat procedures a – d for each selected parameter.
  - Preview the results in the results window.
    a. Please note that users have the option to modify the results by adding or removing parameters and values.
    b. To remove parameters and values, click on the red circle next to the parameter and value set that is to be removed (Figure 13).

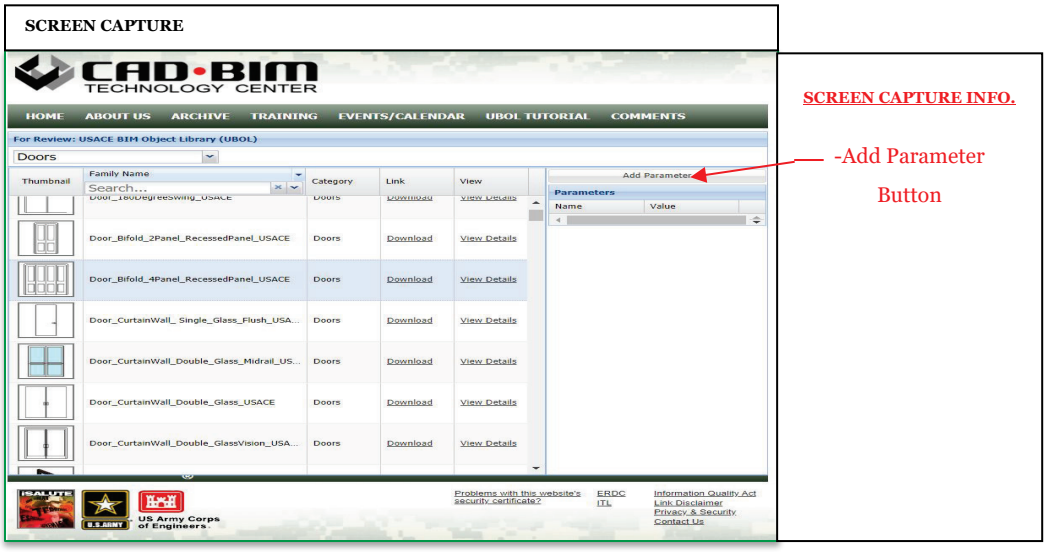


Figure 8. Screen capture that identifies the location of the "Add Parameter" button.

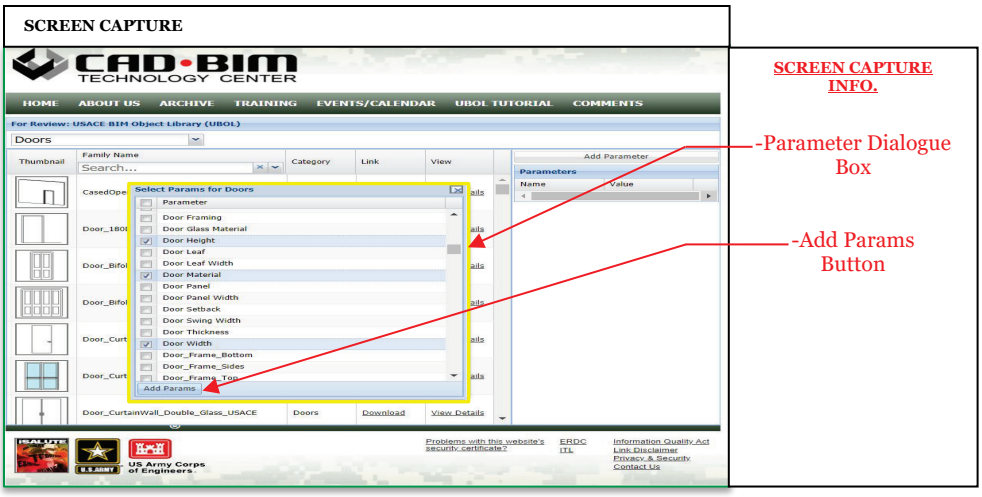


Figure 9. Screen capture that identifies the parameter dialogue box and the "Add Params" button.

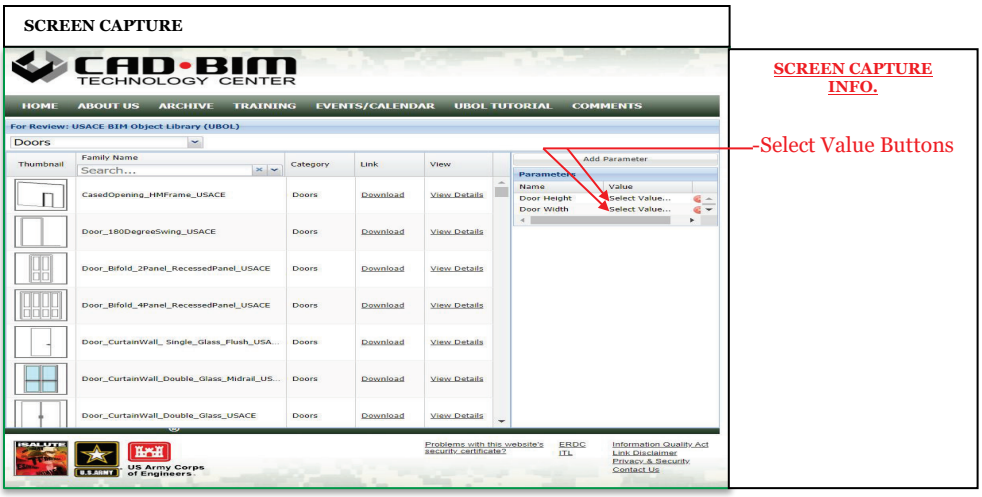


Figure 10. Screen capture that identifies the locations of the "Select Value" buttons.

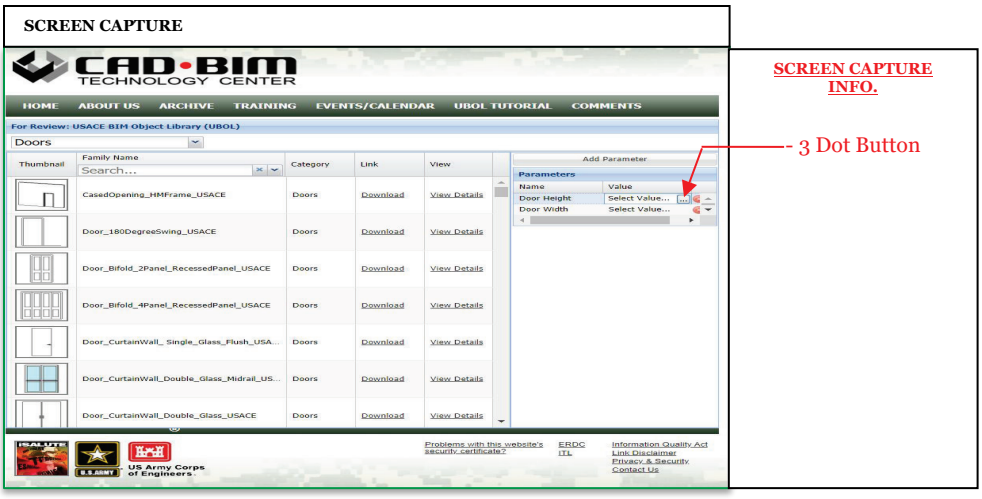


Figure 11. Screen capture that identifies the location of the 3 dot buttons.

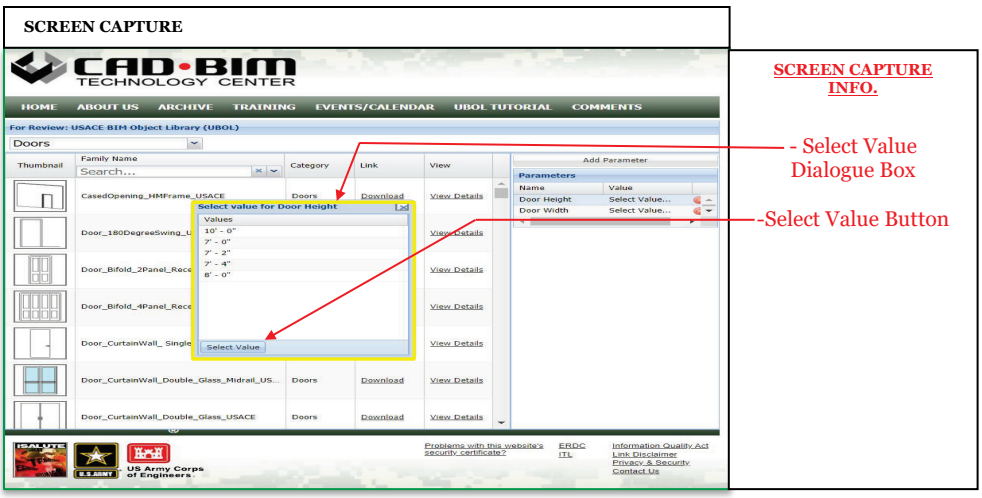


Figure 12. Screen capture that identifies the "Select Value" dialogue box and the location of the "Select Value" button.

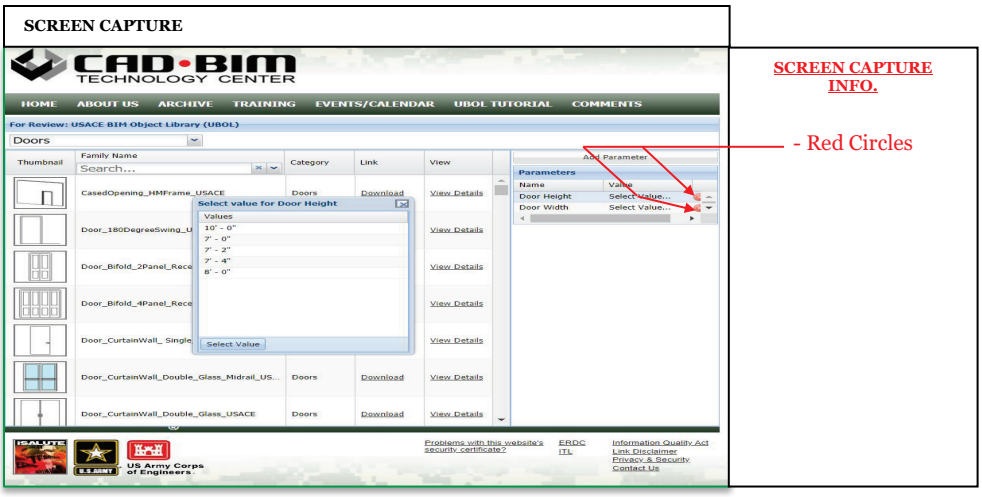


Figure 13. Screen capture that identifies the location of the red circles.

3.4 Step 3

Reviewing Search Results allows the user to view the name and image of the objects identified in the search results. It also gives the user the option to download content.

- Procedures for Step 3
  - Place the cursor in the results window (Figure 14).
  - Scroll up and down to review.
  - Optional: To refine the search results even further, type a keyword in the search box above the search results window. This performs a search based off the names of the objects (Figure 14).

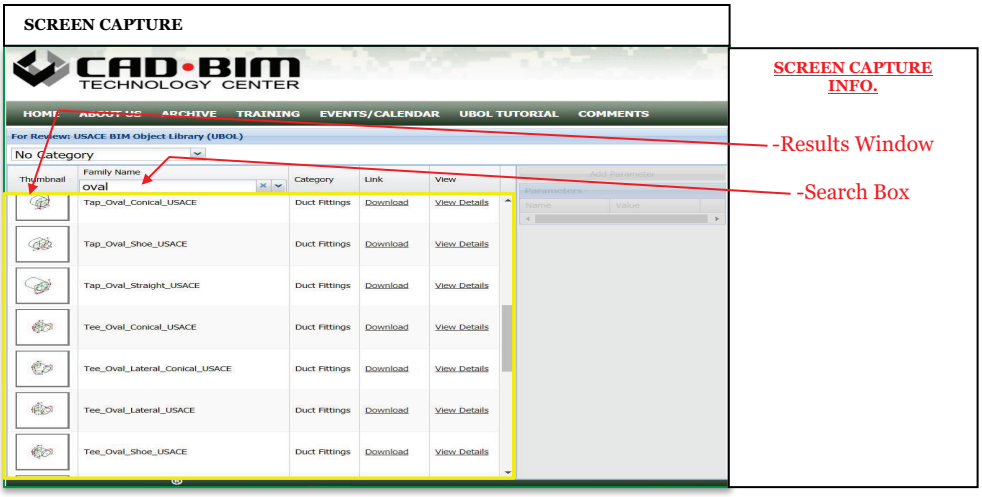


Figure 14. Screen capture that identifies the location of the results window and the search box.

3.5 Step 4

Viewing BIM Object Specific Details allows the user to open a window and view many parameters and values associated with the selected BIM Object.

- Procedure for Step 4
  - Click on "View Details" of a BIM Object to see more information about the object or double click on the name of the object (Figure 15).

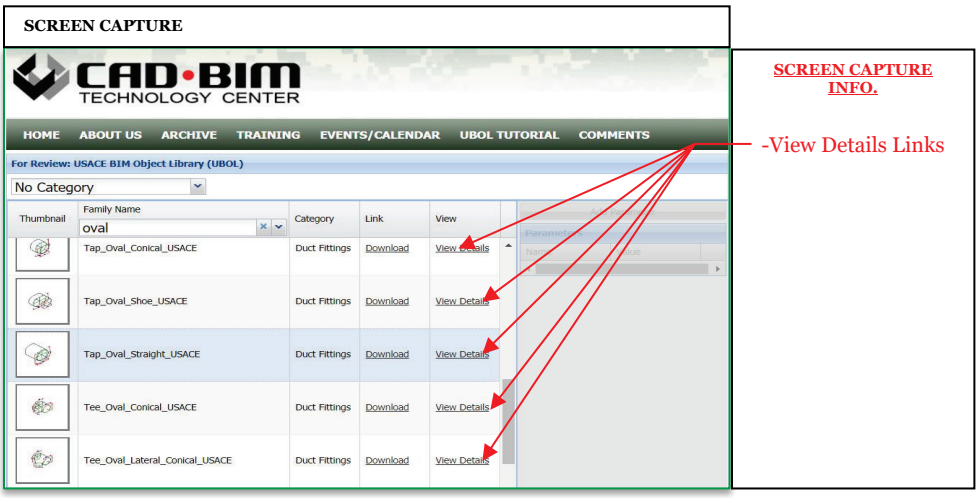


Figure 15. Screen capture that identifies the locations of the "View Details" links. Users can click on these links of multiple BIM Objects to open multiple windows and compare objects side by side.

3.6 Step 5

Reviewing the Detail Information Page allows the user to review all captured information associated with a given BIM Object. The user can scroll horizontally to view all data associated with the particular object.

- Procedure for Step 5
  - Use the horizontal scroll bar to view all parameters and values associated with the selected BIM Object (Figure 16).

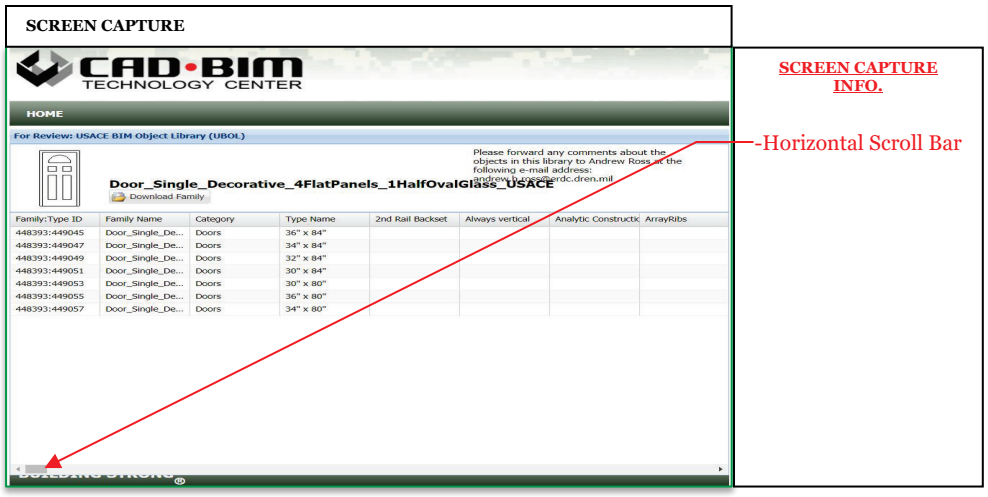


Figure 16. Screen capture that identifies the location of the horizontal scroll bar.

3.7 Step 6

Downloading Content allows the user to get the desired content on their workstations after reviewing the search results.

- Procedures for Step 6
  - Identify the BIM Objects to download.
  - Click the download button for each BIM Object that is desired to be downloaded (Figure 17).

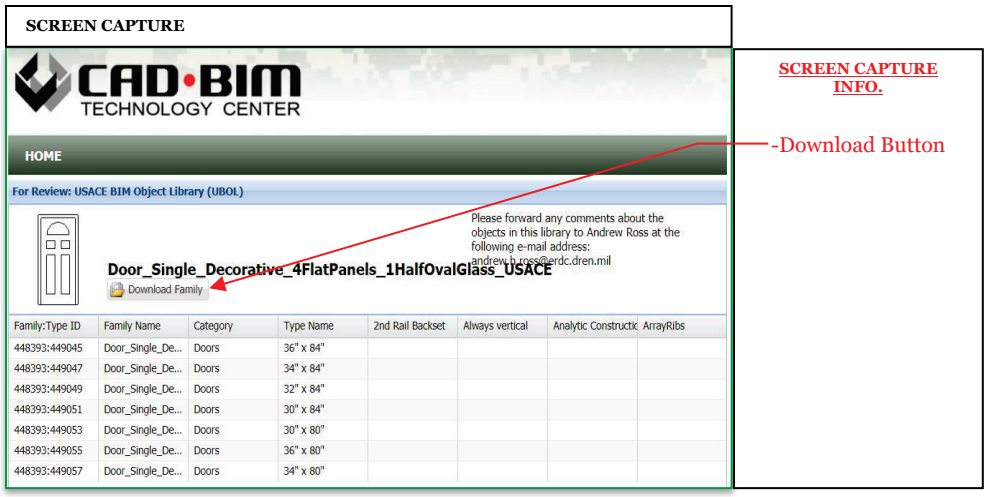


Figure 17. Screen capture that identifies the location of the download button.

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. REPORT DATE *(DD-MM-YYYY)*	**2. REPORT TYPE**	**3. DATES COVERED** *(From - To)*
September 2020	Final	

4. TITLE AND SUBTITLE
USACE BIM Object Library User Guide, Release 1.0

5a. CONTRACT NUMBER

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER
4902-XX-2460-08

6. AUTHOR(S)

CAD/BIM Technology Center

5d. PROJECT NUMBER
K6HK65

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

U.S. Army Engineer Research and Development Center
Information Technology Center
3909 Halls Ferry Road
Vicksburg, MS 39180-6199

8. PERFORMING ORGANIZATION REPORT NUMBER

ERDC/ITL SR-20-14

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

10. SPONSOR/MONITOR'S ACRONYM(S)

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION / AVAILABILITY STATEMENT
Approved for public release; distribution is unlimited.

13. SUPPLEMENTARY NOTES

14. ABSTRACT

The U.S. Army Corps of Engineers (USACE) is in need of a centralized repository of standardized Building Information Modeling (BIM) Objects. This repository is needed to serve as the BIM Object Library to be utilized by architects and engineers on architectural and engineering federal design projects. Alone, the U.S. has more than 109,000 registered architects and 820,000 licensed professional engineers that could potentially have access to this BIM Object Library. The CAD/BIM Technology Center has currently harvested more than 8,500 BIM Objects from USACE districts. It is expected that the USACE BIM Object Library will grow to more than 35,000 BIM Objects based on the existing content being managed by each individual USACE district.

The CAD/BIM Technology Center's research shows that the content management system solution needs to provide BIM objects that contain all the information required to design, find, locate, specify, interrogate, and analyze the represented product. The study also shows the solution should provide an intuitive interface which allows users to easily retrieve the BIM objects that meet a set of user defined criteria. Furthermore, the solution should verify the BIM Objects selected for inclusion into the USACE BIM Object Library comply with the advanced modeling object standard. Finally, the study shows that the solution should be capable of efficiently and effectively managing and querying at least 5 million parameters and associated values.

15. SUBJECT TERMS
Building information modeling
Buildings – Computer-aided design
Information modeling
Information resources management

16. SECURITY CLASSIFICATION OF:			**17. LIMITATION OF ABSTRACT**	**18. NUMBER OF PAGES**	**19a. NAME OF RESPONSIBLE PERSON: Andrew Ross**
a. REPORT	**b. ABSTRACT**	**c. THIS PAGE**			**19b. TELEPHONE NUMBER** *(include area code)*
UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	SAR	22	601-634-2390