

Course challenge exercise with grading rubric

Generate a concrete and steel quantity summary

Use Autodesk Construction Cloud (ACC) Docs and Takeoff to produce a one-page summary of all concrete foundations and structural steel in the provided structural model and sheets.

The estimating team needs reliable quantities before bid day. Your task is to capture concrete volumes for spread footings, wall footings, slab footings, and concrete walls, and to calculate structural steel weight for all columns and framing members. Concrete will be measured from 2D plans and 3D geometry; steel weight will be derived from the BIM *Volume* parameter and a standard steel density conversion.

Create and organize a Takeoff Package, define the necessary takeoff types, assign elements, export the results, and prepare a brief spreadsheet-based report. Demonstrate the skills you learned in this course: sheet calibration, 2D/3D takeoff tools, Model Browser filtering, CSV export, and basic quantity post-processing.

Complete the required activities:

- Create a Takeoff Package and name it “*Course Challenge – Your Initials*” and publish Sheet S.1 plus the latest structural model
- Define takeoff types:
 - **Spread Footings** (2D Count)
 - **Wall Foundations** (2D Linear)
 - **Slab Foundations** (2D Area)
 - **Concrete Walls/Cores** (3D BIM)
 - **Structural Columns** (3D BIM)
 - **Structural Framing** (3D BIM)
- Calibrate Sheet S.1, then perform all footing takeoffs on the sheet; for 3D use the Model Browser to identify types and Select All Instances to assign 3D elements for walls, columns, and framing.
- Export the combined CSV and add a **Weight (tons)** column for steel:
Imperial: $Weight (tons) = Volume (ft^3) \times 0.245$
Metric: $Weight (tonnes) = Volume (m^3) \times 7.85$.
- Create a pivot table (or simple summary) listing:
 - Concrete volume by type (yd³ or m³)
 - Steel weight by type (tons or tonnes)
- Create a folder under your project files in Docs and name it “*Course Challenge Exercise*”. Upload the spreadsheet and the pivot screenshot or summary to this folder.

Success Criteria:

- **Accurate data upload/publishing:** model and sheet are available in Docs and linked to the Takeoff Package.
- **Correct takeoff-type setup:** names, tools, outputs, and classifications match the list above.
- **Proper sheet calibration and element assignment:** all concrete and steel elements are captured without duplication or omission.
- **Valid quantity calculations:** concrete volumes and steel weights follow the prescribed formula and units.
- **Clear, well-formatted summary** uploaded to the correct ACC folder.

Grading Rubric:

	Advanced	Proficient	Basic	Emerging
Data upload & package setup	Model and sheet correctly published; Takeoff Package named and organized per instructions	Model/sheet published, minor naming or folder issues	Model or sheet missing or package mis-named	Model/sheet not published or inaccessible
Takeoff-type definition	All five types were created with the correct tools, outputs, classifications, and colors	All five types created with minor parameter errors	3-4 types created or significant parameter errors	Fewer than three correct types
Element assignment & calibration	All relevant elements assigned; sheet perfectly calibrated; no duplicates	>90 % elements assigned; minor calibration offset	Significant elements missed or duplicates present	Major omissions: calibration incorrect or not done
Quantity calculations	Concrete volumes and steel weights are very accurate; pivot clear and unit-consistent	Quantities are fairly accurate; minor unit or rounding issues	Quantities are somewhat accurate; formula or unit mistakes	Quantities are not accurate or not provided
Summary & reflection quality	Spreadsheet well-formatted; lists assumptions & potential errors	Spreadsheet readable; key assumptions listed	Limited formatting	Summary missing