



User Manual

CIVILAB 2023

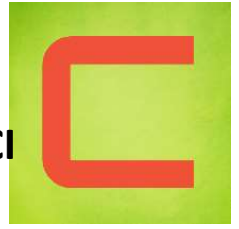
CONCRETE MIX DESIGN –ACI METHOD

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BAKHTI SOFTWARE

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How to use CiviLab to perform the concrete mix design ACI Method?

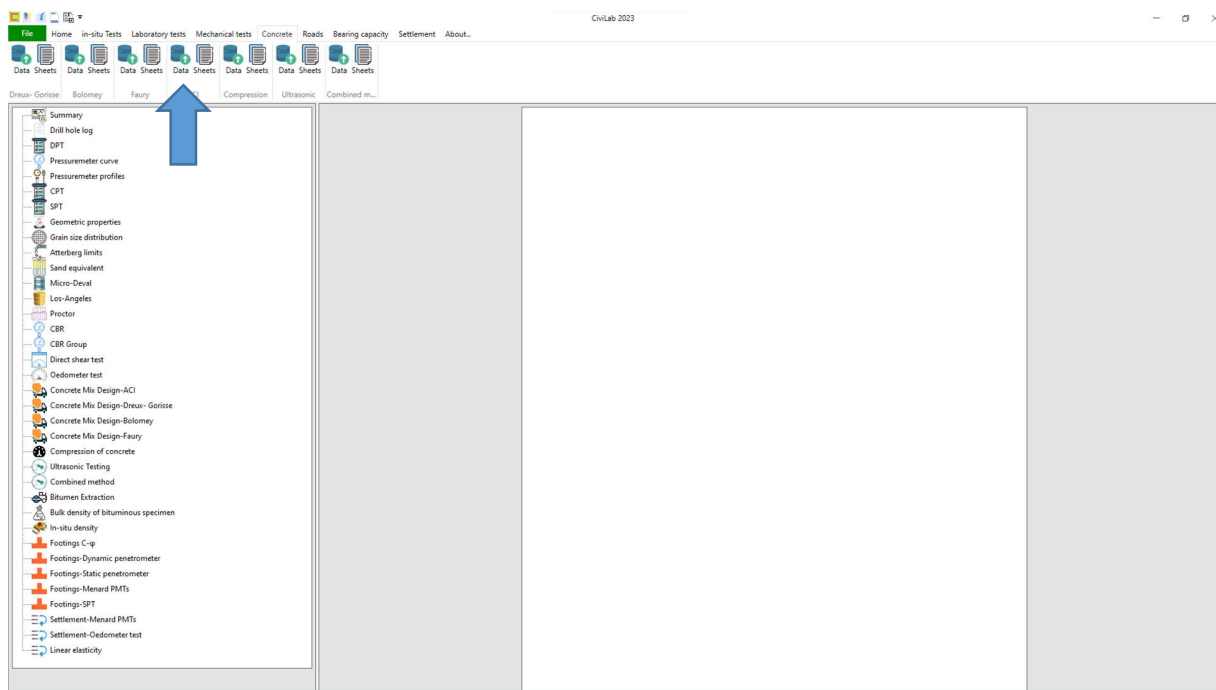
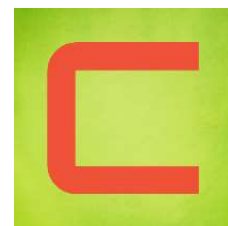


1- Test Data:

Click on the "Concrete" tab then click on the "Data" button in the "ACI" panel, then input:

- The test name;
- The test date;
- The layer used;
- Choose the unit (SI or FPS);
- Choose if the statistical data is available or not (if it is available then enter the standard deviation) ;
- Choose the exposure condition
- Choose the sulfate exposure level;
- Select if the concrete is air-entrained concrete and the exposure level ;
- Select if the concrete is underwater concrete;
- Select the desired workability (Slump);
- Enter the design strength;
- Enter the maximum size of aggregate;
- Enter the coarse aggregate specifications (description, Type of gravel, relative density, bulk density, moisture content and Absorption);
- Enter the fine aggregate specifications (description, relative density, fineness modulus, moisture content and absorption);
- Enter the water reducer specifications (description, reduce water by % , dosage);
- Enter the air-entraining description and dosage;
- Enter the cement description and relative density.

Click on the button of "Add/Modify";



Concrete Mix Design (ACI)

Test No.: Concrete Mix Design N°1

Test date: vendredi 16 juillet 2021

Layer: Texts

Unit: SI: International System of Units (metric)

Data

Statistical data available: No

Standard deviation (Mpa): 0

Exposure condition: Concrete exposed to freezing and thawing in a moist condition or deicers

Sulfate exposure: Severe

Air-entrained concrete: Yes

Level of exposure: Moderate exposure

Underwater concrete: No

Calculate Add/Modify Remove

Results

Dry aggregates

Water (kg)	162,90
Cement (kg)	484,82
Coarse aggregate (kg)	1045,87
Fine aggregate (kg)	650,32
Air-entraining (g)	242,41
Water reducer (q)	1454,46

Batch Adjustments

Water (kg)	160
Cement (kg)	490
Coarse aggregate (kg)	1045
Fine aggregate (kg)	650
Air-entraining (g)	240
Water reducer (g)	1400

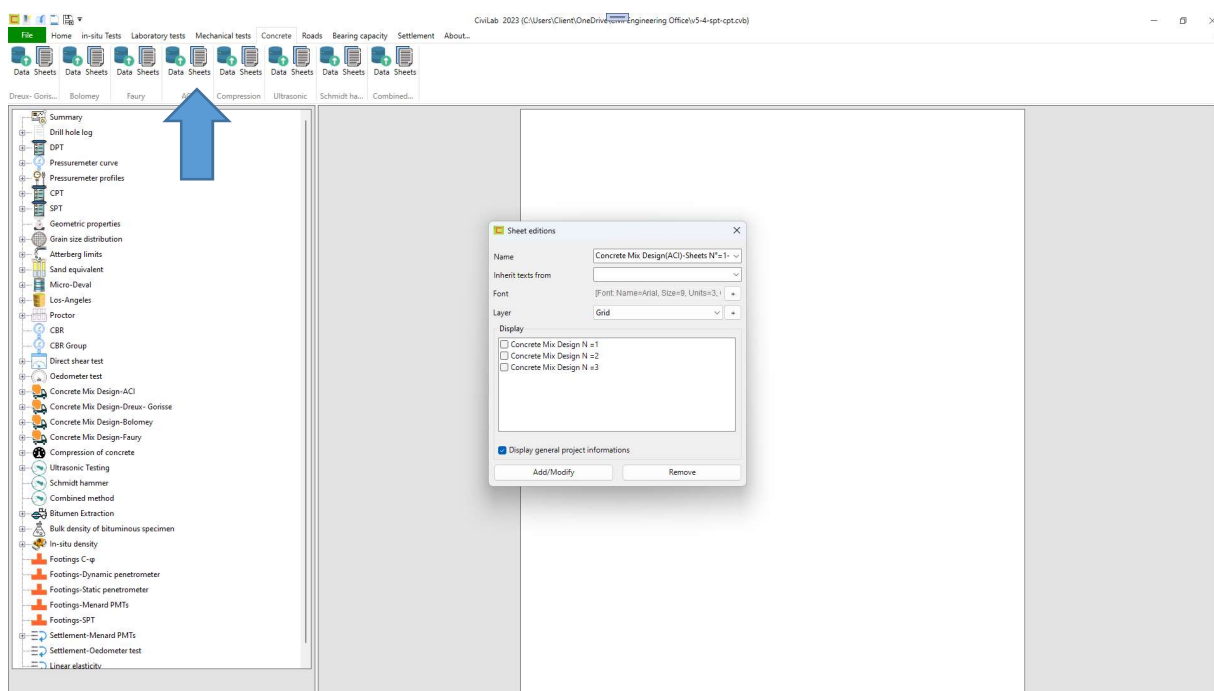


2- Add a sheet:

Click on the "Sheets" button in the "ACI" panel and input:

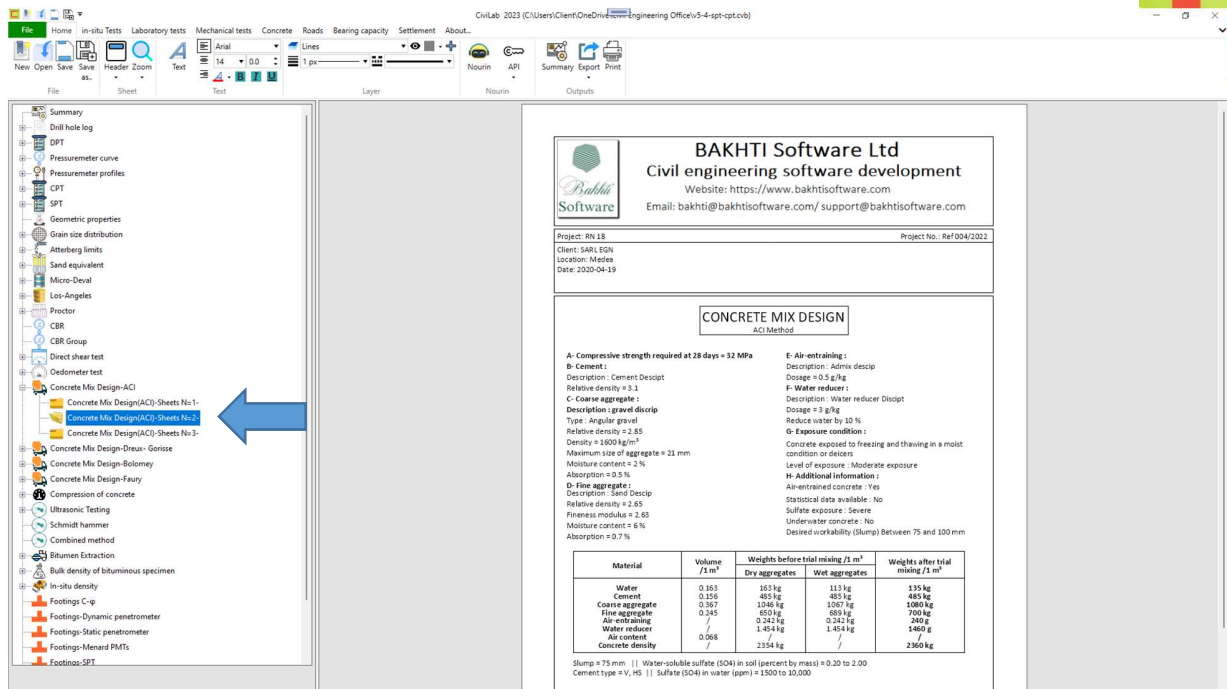
- The sheet name;
- Select the font;
- Select the layer used in the background drawing;
- Select the tests;
- To display general project information's check the corresponding box;

Then click on "Add/Modify" button



3- Display the report

To display the report, click on the sheet name in the tree view



The screenshot displays the BAKHTI Software Ltd CivilLab 2023 interface. The left sidebar shows a project tree with various test types. A blue arrow points to the 'Concrete Mix Design (ACI) Sheets No:1' item. The main window displays a detailed report for 'CONCRETE MIX DESIGN'.

BAKHTI Software Ltd
Civil engineering software development
Website: <https://www.bakhtisoftware.com>
Email: bakhti@bakhtisoftware.com / support@bakhtisoftware.com

Project: BN 18
Client: SABL EGN
Location: Medan
Date: 2020-04-19

CONCRETE MIX DESIGN
ACI Method

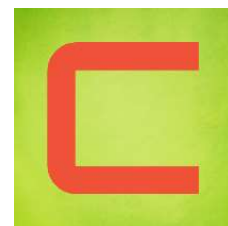
A - Compressive strength required at 28 days = 32 MPa
B - Cement :
Description : Cement Discip
Relative density = 3.1
C - Coarse aggregate :
Description : gravel discip
Type : Angular gravel
Relative density = 2.55
Density = 1600 kg/m³
Maximum size of aggregate = 21 mm
Moisture content = 2 %
Absorption = 0.5 %
D - Fine aggregate :
Description : Sand Discip
Relative density = 2.65
Fineness modulus = 2.63
Moisture content = 6 %
Absorption = 0.7 %

E - Air-entraining :
Description : Admix discip
Dosage = 0.5 g/kg
F - Water reducer :
Description : Water reducer Discip
Dosage = 3 g/kg
Reduce water by 10 %
G - Exposure condition :
Concrete exposed to freezing and thawing in a moist condition or deicers
Level of exposure : Moderate exposure
H - Additional information :
Air-entrained concrete : Yes
Statistical data available : No
Sulfate exposure : Severe
Underwater concrete : No
Desired workability (Slump) Between 75 and 100 mm


Material	Volume /m ³	Weights before total mixing /m ³		Weights after total mixing /m ³
		Dry aggregates	Wet aggregates	
Water	0.163	163 kg	113 kg	155 kg
Cement	0.156	453 kg	453 kg	485 kg
Coarse aggregate	0.367	1246 kg	1507 kg	1080 kg
Fine aggregate	0.245	650 kg	680 kg	700 kg
Air-entraining	/	0.242 kg	1.454 kg	240 g
Water reducer	0.068	2354 kg	/	1460 g
Air content	/	/	/	2360 kg
Concrete density	/	/	/	/

Slump = 75 mm | | Water-soluble sulfate (SO₄) in soil (percent by mass) = 0.20 to 2.00
Cement type = V, HS | | Sulfate (SO₄) in water (ppm) = 1500 to 30,000

To export or print the report, click on "Home" tab, then click the appropriate button in the outputs panel (Print or Export button)



4- Test report :



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Civil engineering software development
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a

Project: Suivi RN 18

Project No.: Ref 008/2020

Client: DTP
Location: Medea
Date: 2021-07-16
Tested by: R.BAKHTI

Checked by: LAIB

CONCRETE MIX DESIGN
ACI Method

A- Compressive strength required at 28 days = 31 Mpa

B- Cement :
Description : ASTM C 1157
Relative density = 3,15

C- Coarse aggregate :
Description : ASTM C 33
Type : Angular gravel
Relative density = 2,8
Bulk density = 1600 kg/m³
Maximum size of aggregate = 25 mm
Moisture content = 2 %
Absorption = 0,5 %

D- Fine aggregate :
Description : ASTM C 33
Relative density = 2,65
Fineness modulus = 2,82
Moisture content = 6 %
Absorption = 0,7 %

E- Air-entraining :
Description : ASTM C 260
Dosage = 0,5 g/kg

F- Water reducer :
Description : ASTM C 494
Dosage = 3 g/kg
Reduce water by 10 %

G- Exposure condition :
Concrete exposed to freezing and thawing in a moist condition or deicers
Level of exposure : Moderate exposure

H- Additional information :
Air-entrained concrete : Yes
Statistical data available : No
Sulfate exposure : Moderate
Underwater concrete : No
Desired workability (Slump) Between 75 and 100 mm

d

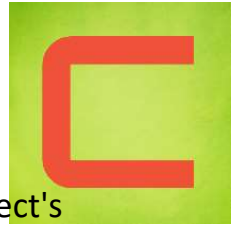
Material	Volume /1 m³	Weights before trial mixing /1 m³		Weights after trial mixing /1 m³
		Dry aggregates	Wet aggregates	
Water	0,158	158 kg	106 kg	145 kg
Cement	0,145	457 kg	457 kg	460 kg
Coarse aggregate	0,382	1069 kg	1090 kg	1100 kg
Fine aggregate	0,251	665 kg	705 kg	705 kg
Air-entraining	/	0,228 kg	0,228 kg	228 g
Water reducer	/	1,370 kg	1,370 kg	1370 g
Air content	0,065	/	/	/
Concrete density	/	2358 kg	/	2290 kg/m³

Slump = 75 mm || Water-soluble sulfate (SO4) in soil (percent by mass) = 0.10 to 0.20
Cement type = II, MS, IP(MS), IS(MS), P(MS), I(PM)(MS), I(SM)(MS) || Sulfate (SO4) in water (ppm) = 150 to 1500

Software: CivilLab 2022

a. Sheet Header Presentation: To import or modify the sheet header, go to the "Home" tab and select the "Header" button.





b. Project Name and Reference: These details can be entered from the project's general information found in the File menu.

c. Area for Displaying Test Information: Test information can be input within this area from the Test Information window (to show it click on the “+” button next to the name of the test on Data window) and project's general information window.

d. Area for results: this area is designated to visualize the concrete mix results.