

# DESIGN - Engineering calculations

Before

The image shows a detailed manual calculation spreadsheet for retaining wall design. It includes various input parameters, tables for seismic coefficients, and a list of calculated results.

$H_u$	1.60 [m]	Altura del muro, si no existe $H_u=0,0$
$B$	2.00 [m]	Ancho del muro, si no existe muro $B=0,0$
$q$	2.50 [kN/m <sup>2</sup> ]	Sobrecarga
$K_{st}$	0.16 [-]	Coefficiente de empuje sísmico (ver tabla $K_{st}$ )
$R$	1.00 [-]	Factor de reducción de la fuerza sísmica
$f_m$	1.20 [Mpa]	Resistencia a compresión de la mampostería
$f_y$	420.00 [Mpa]	Fluencia del acero
$e$	0.15 [m]	Espesor del muro
$e_{cr}$	0.03 [-]	Relación entre módulos D. 12.4.3 y D.5.2 - 3
$n$	6.09	Distancia al eje neutro
$C$	0.12	

$fr$	$C_s$	$K_{st}$	$m$	$n$
36	0.13	0.115	2.315	-0.1862
39	0.13	0.130	2.265	-0.1645
42	0.13	0.139	2.335	-0.1645
45	0.13	0.144	2.5	-0.1813

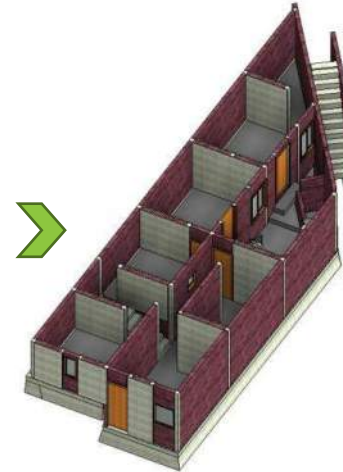
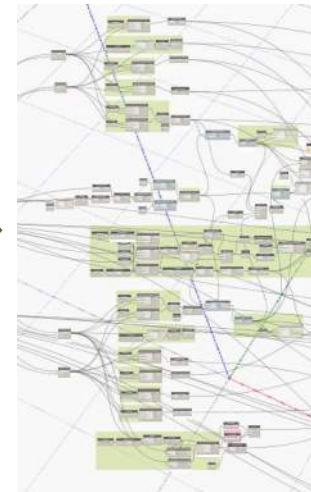
$P$	1.30 [kN]	Fuerza axial sobre el muro
$A_{sh}$	130.00 [mm <sup>2</sup> /m]	As dispuesto horizontalmente
$A_{sv}$	140.00 [mm <sup>2</sup> /m]	As dispuesto verticalmente
$G_{max}$	14.22 [kN/m <sup>2</sup> ]	Empuje estático máximo
$G_{st}$	2.29 [kN/m <sup>2</sup> ]	Empuje sísmico
$H_{M_{max}}$	0.89 [m]	Profundidad del momento flector máximo
$M_{max}$	6.42 [kN·m]	Momento flector máximo
$\sigma_{compres}$	0.72 [Mpa]	Esfuerzo actuante a compresión
$\sigma_{traccion}$	0.70 [Mpa]	Esfuerzo actuante a tracción
$\sigma_{admisible}$	0.40 [Mpa]	Esfuerzo admisible a compresión D-1.5-6
$\sigma_{admisible}$	170.00 [Mpa]	Esfuerzo admisible a tracción D-1.5-18
$C_{ad}/C_{ac}$	1.899 [-]	Relación entre la compresión admisible y la compresión actuante
$T_{ad}/T_{ac}$	241.6 [-]	Relación entre la tracción admisible y la tracción actuante

After

 +  
Autodesk Revit®

 +  
Dynamo®

 +  
Autodesk Revit®



Prescriptive pre-engineered checks are coded in Dynamo® scripts and, based on the existing Revit 3D model, a retrofit intervention is automatically proposed.

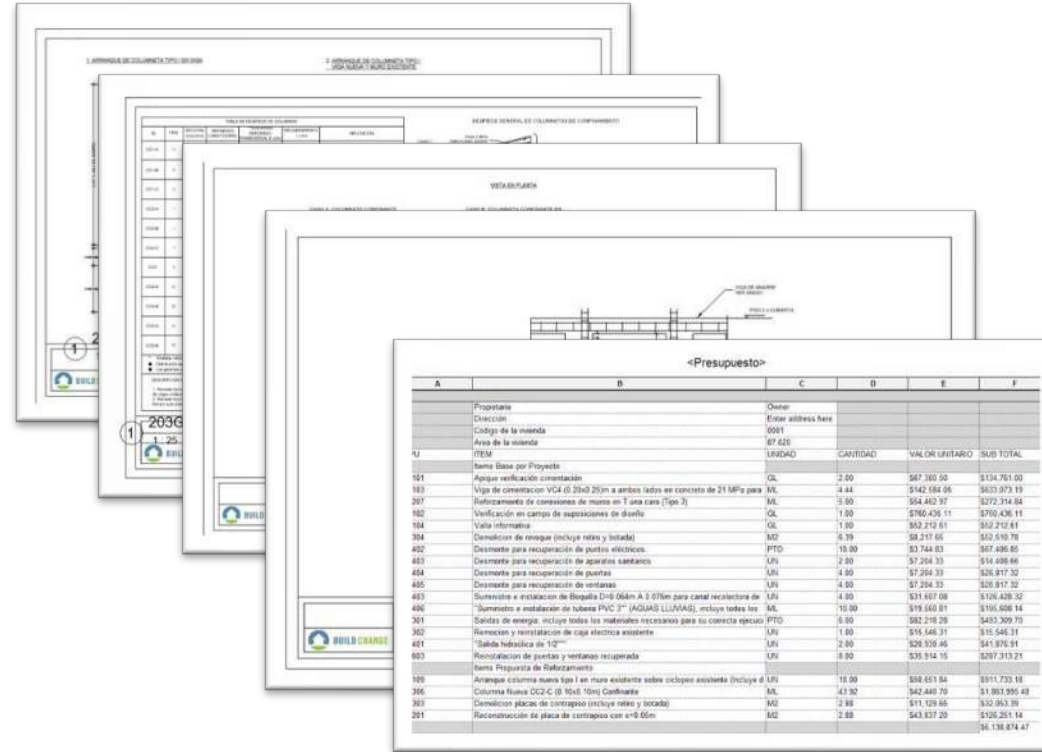


# DESIGN - Drawings & BOQ

Before



After



Drawings, construction details and bill of quantities are automatically generated.



# BUILD - Construction supervision

Before

**PLINTH BEAM**

**MATERIALS | QUALITY AND PRACTICE**

PLINTH BEAM REINFORCEMENT			
Grade 60 (415 MPa yield strength)	Ribbed		
Main rebars	2x2 bars of 12 mm		
Stirrups	1-closed-loop 6 mm bar (135° hook) @150 mm c/c		
Concrete cover	25 mm		
Lap/band length	720 mm		

**REINFORCED CEMENT CONCRETE (RCC) MIX - M20**  
1 cement : 1.5 sand : 3 aggregate (1 water MAX)

CEMENT	SAND	WATER	MIX
Portland, type 1, dry, unopened bags.	Use clean, washed, river sand	Use clean water (not salty or muddy). Do not use too much water! Add water gradually as needed.	Mix on a clean, concrete or asphalt surface. Turn over 3 times or until color is uniform.

**GRAVEL**  
Crushed, angular, max 20 mm.

**FORMWORK**

PLYWOOD	SPACERS
19 mm	SIZE LOCATION

**CONSTRUCTION SEQUENCE | STEPS FOR GOOD PRACTICE**

APPLICABLE FOR THIS TRANCHE

PLINTH BEAM FRAMEWORK	INITIAL VISIT	FOLLOW UP
Place concrete spacers at every 4-5 stirrups.		
Formwork is level.		
Formwork is aligned straight between wall segments.		
Formwork panels sufficiently tight to prevent leakage of cement past.		
Formwork panels braced and tied together to maintain position and shape.		

APPLICABLE FOR THIS TRANCHE

PLINTH BEAM REINFORCEMENT	INITIAL VISIT	FOLLOW UP
Steel reinforcements conform with requirements.		
Observe correct development length of main bars at intersections.		
Rotate stirrups at each installation.		
Observe correct spacing of stirrups.		
Plinth beam reinforcement is correctly placed with spacers for concrete cover.		

After

LATAM - Encuesta global viviendas v2.1 rev0 (CVP) (editing)

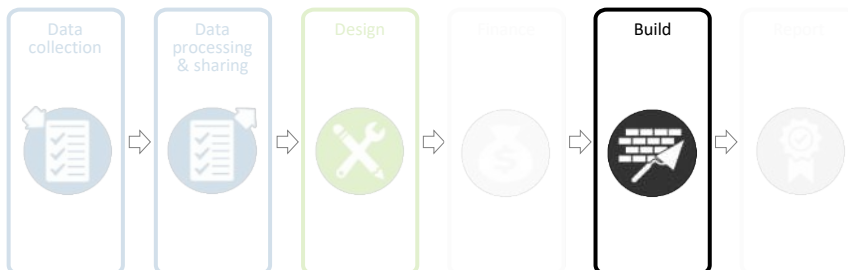
COL-CVP\_5abb116d / > SUPERVISIÓN DE OBRA / >> Visitas de supervisión (3 Items)



8 abril 2021 (Demolición, Excavación), COL - Colombia • Charles View >

13 abril 2021 (Cimentaciones), COL - Colombia • Charles View >

16 abril 2021 (Muros, Vigas y dinteles), COL - Colombia • Stefano View >



# BUILD - AI checks (beta)

Before

**PLINTH BEAM**

**MATERIALS | QUALITY AND PRACTICE**

**1 PLINTH BEAM REINFORCEMENT**

Grade 60 (415 MPa yield strength)	Ribbed
Main rebars	2x2 bars of 12 mm
Stirrups	1-closed-loop 6 mm bar (135° hook) @150 mm c/c
Concrete cover	25 mm
Lap/band length	720 mm

**2 REINFORCED CEMENT CONCRETE (RCC) MIX - M20**

1 cement : 1.5 sand : 3 aggregate (1 water MAX)

CEMENT	SAND	WATER	MIX
Portland, type 1, dry, unopened bags.	Use clean, washed, river sand	Use clean water (not salty or muddy). Do not use too much water! Add water gradually as needed.	Mix on a clean, concrete or asphalt surface. Turn over 3 times or until color is uniform.

**GRAVEL**

Crushed, angular, max 20 mm.

**FORMWORK**

PLYWOOD	SPACERS
19 mm	SIZE LOCATION

**CONSTRUCTION SEQUENCE | STEPS FOR GOOD PRACTICE**

**APPLICABLE FOR THIS TRANCHE**

**PLINTH BEAM FRAMEWORK**

Place concrete spacers at every 4-5 stirrups.  
Formwork is level.  
Formwork is aligned straight between wall segments.  
Formwork panels sufficiently tight to prevent leakage of cement past.  
Formwork panels braced and tied together to maintain position and shape.

INITIAL VISIT	FOLLOW UP
yy/mm/dd	yy/mm/dd
1	
2	
3	
4	
5	
YES	NO
YES	NO

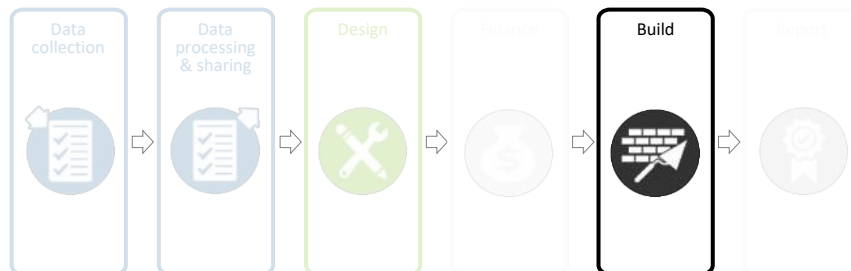
**APPLICABLE FOR THIS TRANCHE**

**PLINTH BEAM REINFORCEMENT**

Steel reinforcements conform with requirements.  
Observe correct development length of main bars at intersections.  
Rotate stirrups at each installation.  
Observe correct spacing of stirrups.  
Plinth beam reinforcement is correctly placed with spacers for concrete cover.  
See page 2 "VISUAL SUMMARY".

INITIAL VISIT	FOLLOW UP
yy/mm/dd	yy/mm/dd
1	
2	
3	
4	
5	
YES	NO
YES	NO

After



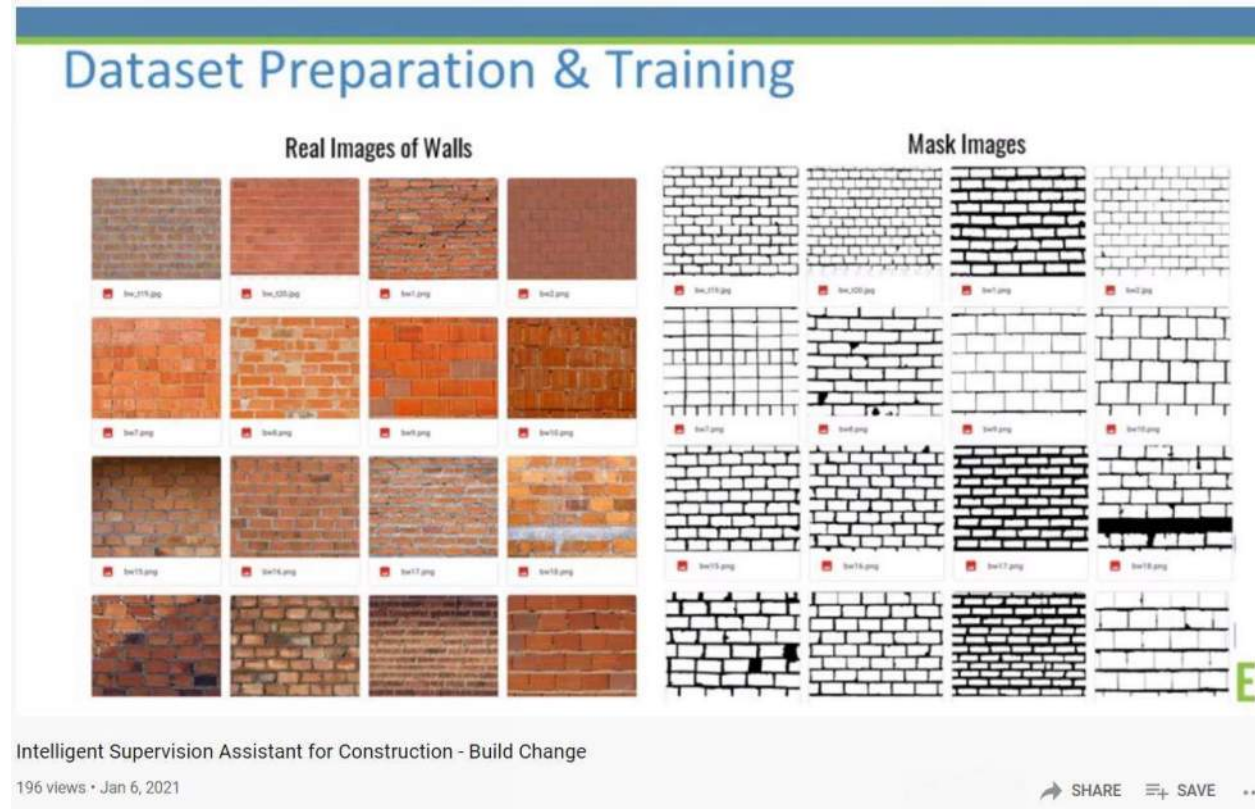


# BUILD - Intelligent Supervision Assistant for Construction

For more information:



<https://www.youtube.com/watch?v=145ytpzG3I8>





A photograph showing a corner of a stone wall under construction. The wall is built with large, irregular, light-brown stones set in a thick, reddish-brown mortar. In the foreground, a wooden formwork structure is visible, consisting of several vertical and horizontal wooden planks. A yellow, heavy-duty webbing strap is stretched across the corner of the formwork, held in place by a small metal pin. The word "Achievements" is overlaid in white text on the yellow strap. In the upper right corner, a section of wire mesh is visible, likely for reinforcement. The sky is a clear blue.

Achievements



# ACHIEVEMENTS



- We improved data management and processing.
- We reduced the chance of mistakes and oversights.
- We increased the transparency in each step of the evaluating and designing process.
- Structural engineers and architects time leveraged better.
- Enabled remote training to expand our workflows through partners.
- We reduced the time to assess and design a house from 9 to 1.5 days.
- We reduced costs.



# THANK YOU!

QUESTIONS?  
Please type them in the chat  
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 @BuildChange

[www.buildchange.org](http://www.buildchange.org)

