

## [0102] Loads

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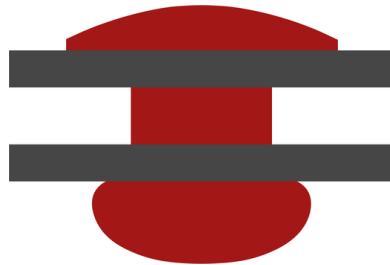
### [ 1 ] Project Summary

This report **describes** the structural design of a solar canopy *covering* a residential patio located in the City of Larkspur, California. It includes the design of a concrete slab and *stem* wall, steel tube frame, and clip attachments of solar panels to the frame.

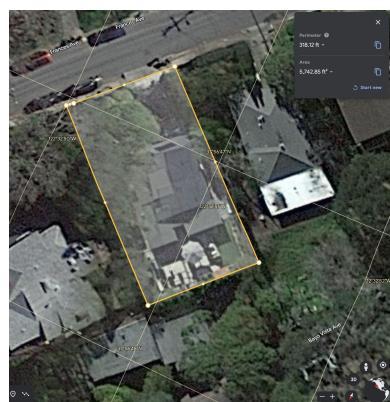
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### [ 2 ] Overview and Codes

This report **describes** the structural design of a solar canopy *covering* a residential patio located in the City of Larkspur, California. It includes the design of a concrete slab and *stem* wall, steel tube frame, and clip attachments of solar panels to the frame.



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$$wt_2 = \frac{a_2 \cdot dl_2}{2} + 4$$

## Building Codes and Jurisdiction

- City of Larkspur, California
- 2019 California Building Code [CBC]
- 2019 California Residential Code [CRC]

**Table 01** - My Table [from file: ins01/cbc2019A\_stds.csv]

Category	Standard	Year
Loading	ASCE-7	2016
Concrete	ACI-318	2014
Wood-National Design Specifications	AWC-NDS	2018
Wood-Special Design Provisions for Wind and Seismic	AWC-SDPW S	2015
Wood Frame Construction Manual	AWC-WFC M	2018

Design loads for the project are from the California Building and Residential Codes and are summarized in the following tables.

**Table 02** - Another Table Title [from file: ins01/load\_types01.csv]

Sy m	Load Effect	Notes
D	Dead load	See IBC 1606 and Chapter 3 of this publication
E	Combined effect of horizontal and vertical earthquake-induced forces as defined in ASCE/SEI 12.4.2	See IBC 1613, ASCE/SEI 12.4.2 and Chapter 6 of this publication
Em	Maximum seismic load effect of horizontal and vertical forces as set forth in ASCE/SEI 12.4.3	See IBC 1613, ASCE/SEI 12.4.3 and Chapter 6 of this publication
H	Load due to lateral earth pressures, ground water pressure or pressure of bulk materials	See IBC 1610 for soil lateral loads
L	Live load, except roof live load, including any permitted live load reduction	See IBC 1607 and Chapter 3 of this publication
Li	Roof live load including any permitted live load reduction	See IBC 1607 and Chapter 3 of this publication

R	Rain load	See IBC 1611 and Chapter 3 of this publication
W	Load due to wind pressure	See IBC 1609 and Chapter 5 of this publication

**Table 03** - Load Combinations**Table 04** - xxx [from file: ins01/asce7\_load\_comb.csv]

CBC 2019 reference	Equation
Equation 16-1	1.4(D +F)
Equation 16-2	1.2(D + F) + 1.6(L + H) + 0.5(L or S or R)
Equation 16-3	1.2(D + F) + 1.6(Lr or S or R) + 1.6H + (f1L or 0.5W)
Equation 16-4	1.2(D + F) + 1.0W + f1L + 1.6H + 0.5(Lr or S or R)
Equation 16-5	1.2(D + F) + 1.0E + f1L + 1.6H + f2S
Equation 16-6	0.9D+ 1.0W+ 1.6H
Equation 16-7	0.9(D + F) + 1.0E+ 1.6H

## [ 3 ] Gravity Loads and Seismic Mass

**E01** - First floor dimensions

variable	value	[value]	description
area1	10700.00 sf	994.06 SM	roof area
area2	100000.00 sf	9290.30 SM	floor area
area3	25.00 sf	2.32 SM	floor area
ht1	9.00 ft	2.74 m	wall height
len1	110.00 ft	33.53 m	interior wall length
len2	155.00 ft	47.24 m	exterior wall length
udl1	12.20 psf	584.14 Pa	description

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[from file: valsv01test1.csv]

variable	value	[value]	description
floordl1	50.00 psf	2394.01 Pa	interior wall length
floordl2	10.00 psf	478.80 Pa	exterior wall length

**E02** - Equation for floor areawt<sub>2</sub> = area<sub>2</sub> · floordl<sub>1</sub>

ACI-315-05

wt2	area2	floordl1
5000.00 kips	100000.00 sf	50.00 psf
22241108.00 N	9290.30 SM	2394.01 Pa

**E03** - Equation for wall area

ACI-315-05

$$wt_3 = area_3 \cdot floordl_2 \cdot 0.1$$

wt3	floordl2	area3
25.0 lbs	10.00 psf	25.00 sf
111.2 N	478.80 Pa	2.32 SM

**E04** - Exterior wall - total area load

[from file: valsv01test2.csv]

variable	value	[value]	description
len1	410.00 ft	124.97 m	interior wall length
len2	455.00 ft	138.68 m	exterior wall length