DESIGN EXAMPLE

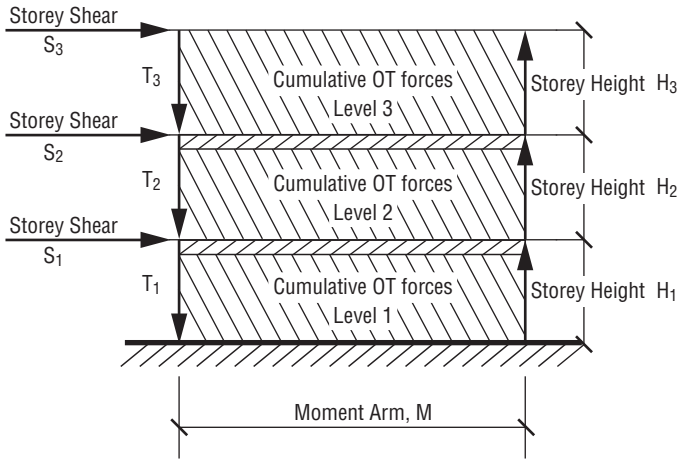
DESIGN NOTES

Specify:

The Designer will need to determine the holdown loads required at each floor. Use the charts provided to pick the appropriate Simpson Strong-Tie® Anchor Tiedown System (ATS) run based on the number of floors and the capacity. The ATS will provide only the tension part of the shearwall; the Designer will need to determine the compression shear edge nailing schedule, horizontal drift, and meet all other requirements in accordance with the applicable building code.

For simplicity during installation the Designer may want to designate and group similar runs.

Given: **8' plate height**
4" nominal wall thickness
Douglas Fir-Larch studs and wall plates



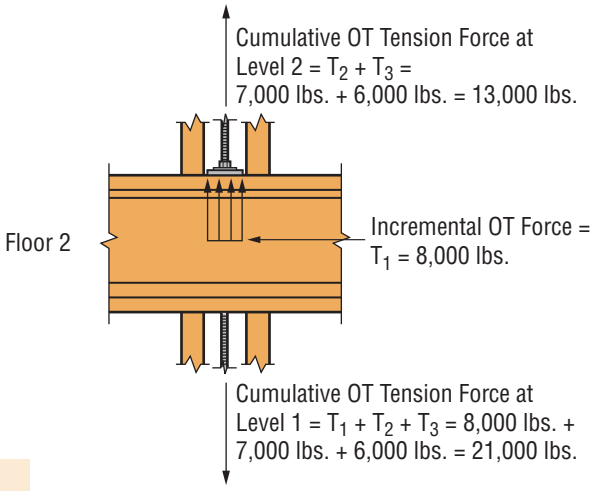
Given Overturning Forces (Factored)

Storey	Cumulative OT Tension Forces (lbs)	Incremental OT Forces (lbs)	Cumulative OT Compression Forces (lbs)
3	6000		8000
		7000	
2	13000		16000
		8000	
1	21000		25000

1. The structural design overturning forces listed above are arbitrary and intended only for this design example. Simpson Strong-Tie is not responsible for structural design of the building or derivation of the structural forces.
2. The incremental OT Forces are the difference between the cumulative OT Forces at each level.

Example for Derivation of Forces at Level 1:

1. Note that Moment Arm, M, is the distance between the centerline of compression members to centerline of tension members.
2. Incremental OT Force = $T_1 = \frac{S_1 (H_1)}{M}$ = 8,000 lbs. The incremental OT Force is calculated at each level. T_2 = 7,000 lbs. T_3 = 6,000 lbs. The incremental OT Forces are typically the incremental bearing forces.
3. Cumulative OT Tension Force at level 1 = $T_1 + T_2 + T_3$ = 6,000 lbs. + 7,000 lbs. + 8,000 lbs. = 21,000 lbs.
4. See sketch at right for additional information.
5. Cumulative OT Compression Forces are higher than Cumulative OT Tension Forces due to the addition of code required load combinations.



Rod Length Calculation = Plate height plus floor system plus 12" rounded up in 1 foot increments.

Rod Length Example:

1 - 2x Plates	=	1.50
2 x 12 Floor System	=	11.25
¾" Floor	=	0.75
		13.50"

8' Plate Height + 13½" + 8" Takeup Clearance = 9'-9½" = Rod Length 10'
Actual rod length will be 2' longer than the plate height for all floors except the top floor, in this example.

DESIGN EXAMPLE

TRY CTDS33 (see table page 22)

Step 1: Check Incremental and Cumulative OT Forces against capacities.

Storey	Load Component	Capacity		Factored Load	
3rd Floor	Factored Tensile Resistance, T_r	9530	>	6000	o.k.
	Incremental Bearing Resistance	15745	>	7000	o.k.
2nd Floor	Factored Tensile Resistance, T_r	19260	>	13000	o.k.
	Incremental Bearing Resistance	17095	>	8000	o.k.
1st Floor	Factored Tensile Resistance, T_r	30675	>	21000	o.k.

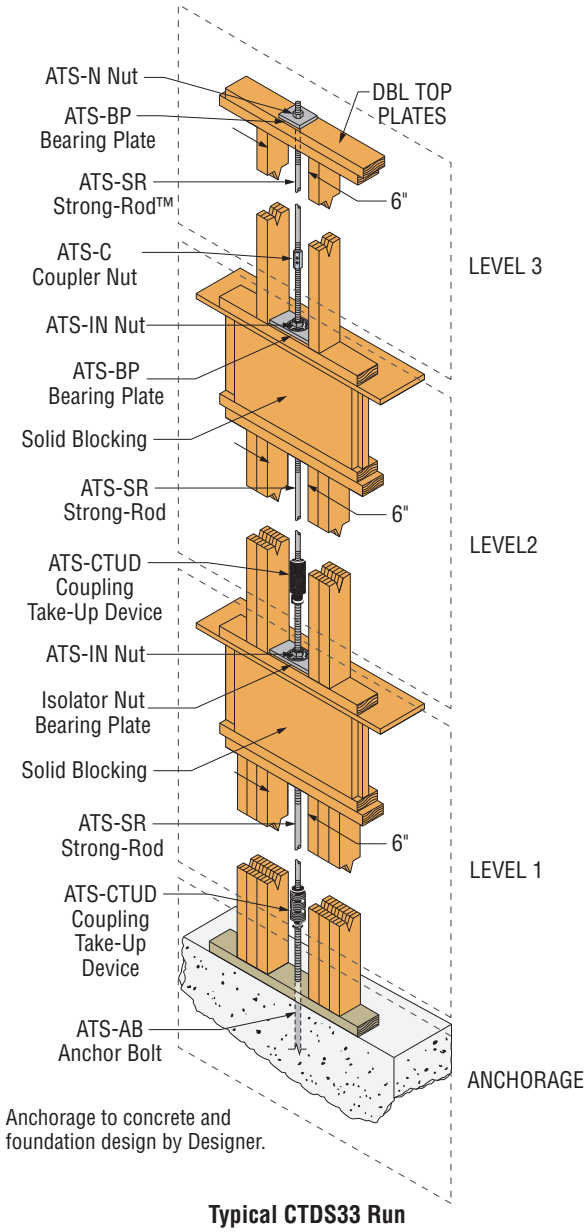
Step 2: Check Compression Members

Storey	Cumulative OT Compression Forces (lbs)		8' D.Fir-L Stud Compression Capacity (lbs)	Compression Member Each Side of ATS Rod
3	8000	<	9478	1-2x4
2	16000	<	18955	2-2x4
1	25000	<	28433	3-2x4

1. Example only reviews compression case for the lumber species, plate height and arbitrary loads assumed. Designer must review compression post and size for any additional loads, load combinations, variations in species, variation in lumber grade or unsupported heights as specified in the code.
2. See page 32 for 9' S-P-F compression member capacities and general assumptions.

Step 3: The Solution

CTDS33 AND COMPRESSION MEMBERS AS SHOWN IN TABLE ABOVE.



Typical CTDS33 Run