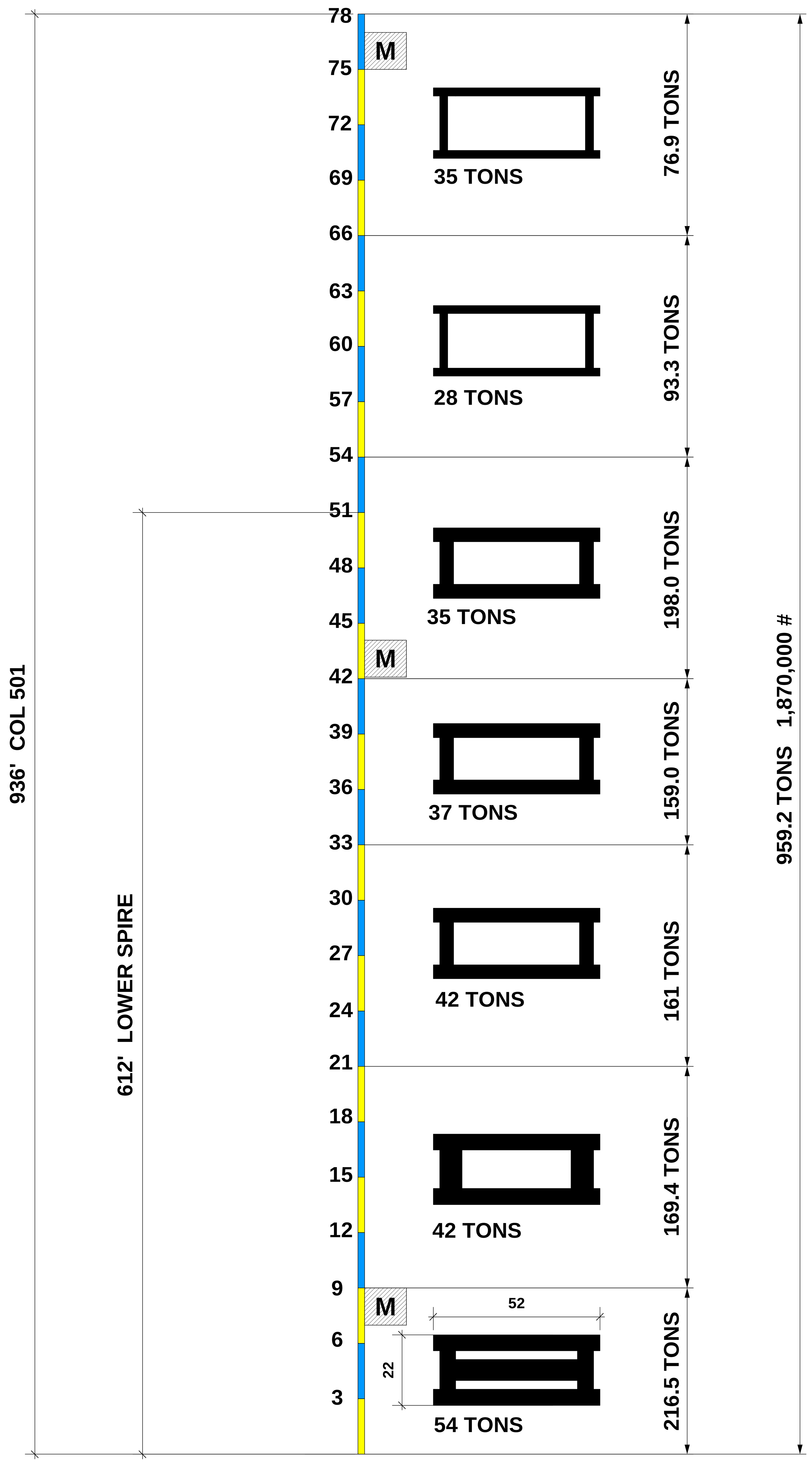
THE "SPIRE" COLUMN 501



NOTE; COLUMN CRISS SECTIONAL AREA DECRESS EVERY 3 FLOORS

PLAN DIMENSION = 52" x 22"

TOTAL HEIGHT TO FLOOR 78 = ~936'

TOTAL WEIGHT TO FLOOR 78 = 1,073.7 TONS / 2,147,312 #

SLENDERNESS RATIO = 1/196 LONG AXIS

SLENDERNESS RATIO = 1/463 SHORT AXIS

In practice, for a given material, the allowable stress in a compression member depends on the slenderness ratio L_{eff} / r and can be divided into three regions: short, intermediate, and long.

Short columns are dominated by the strength limit of the material. Intermediate columns are bounded by the inelastic limit of the member. Finally, long columns are bounded by the elastic limit (i.e. Euler's formula). These three regions are depicted on the stress/slenderness graph below,

The short/intermediate/long classification of columns depends on both the geometry (slenderness ratio) and the material properties (Young's modulus and yield strength). Some common materials used for columns are listed below:

Material	Short Column (Strength Limit)	Intermediate Column (Inelastic Stability Limit)	Long Column (Elastic Stability Limit)
	Slenderness Ratio ($SR = L_{eff} / r$)		
Structural Steel	$SR < 40$	$40 < SR < 150$	$SR > 150$
Aluminum Alloy AA 6061 - T6	$SR < 9.5$	$9.5 < SR < 66$	$SR > 66$
Aluminum Alloy AA 2014 - T6	$SR < 12$	$12 < SR < 55$	$SR > 55$
Wood	$SR < 11$	$11 < SR < (18 \sim 30)$	$(18 \sim 30) < SR < 50$

In the table, L_{eff} is the effective length of the column, and r is the radius of gyration of the cross-sectional area, defined as $r = \sqrt{\frac{I}{A}}$.

SLENDERNESS RATIO

SL = 1/196 SL = 1/463

N-S (52") E-W (22")

DRAWN TO SCALE