



- 1) **SIGN INSTALLER AND MANUFACTURER RESPONSIBILITIES:** By using this engineering the owner, manufacturer, and installer accept responsibility to:
- a) Design sign cabinet, board, and face according to sign code, building code, and UL.
 - b) Verify site conditions match stated wind speed, risk, exposure, topo, and soil factors.
- 2) **ENGINEER'S SCOPE OF WORK:** Design sign support column and foundation to meet structural requirements of building code based on stated (not verified) site factors.
- a) Wind controls structural design. This design only MWFRS; not C&C.
 - b) Size and shape based on sign manufacturer's drawing, attached.
- 3) Wind Design Data
- a) Design Wind Speed, Vult = 115 mph
 - b) Risk Category = II, (MRI = 700 yr)
 - c) Wind Exposure = C, field verify
 - d) Internal Pressure Coefficient, Cpi = NA, (Does not affect column load)
 - e) Component and Cladding Wind Pressure = n/a
- 4) Wind loads by ASCE 7-10, Ch. 29, Fig. 29.4-1, Solid Freestanding Walls and Signs.
- a) Sign Height = 22 ft, Kz = .94; Kd = 0.85.
 - b) Aspect Ratio, B/s = 13'/9' = .62; Clearance Ratio, s/h = 13'/22' = .59; Cf = 1.75
 - c) Gust-Effect Factor, G = .85, (Rigid structure)
 - d) Wind Directionality Factor, Kd = .85, (Solid/open freestanding or attached signs)
 - e) Topographic Factor = 1.0, on flat level grade for 1500 ft, field verify
 - f) Velocity Pressure = qh = 0.00256 * Kz * Kzt * Kd * Vz = .00256 * .94 * .85 * 115^2 = 27.1 psf, Ult
 - g) Factored Wind Pressure = P = qh * G * Cf = qh * .85 * 1.75 = 40.2 psf, Ult
 - h) Wind Force on New Sign = F = P * A = P * 107 ft2 = 4200 lb, Ult
 - i) Wind Force on Existing Sign = F = P * A = P * 185 ft2 = 7700 lb, Ult
 - j) New Moment at Grade = F * h = F * 13.3' = 56 kip.ft, Ult
 - k) Existing Sign Moment at Grade = F * h = F * 21.1' = 162 kip.ft, Ult
- 5) Sign manufacturer/installer's design, detailing, fabrication, and erection shall conform to the following specifications: Building Code, ASTM specifications, ACI-318 for reinforced concrete, American Welding Society Code for Welding in Building Construction, AISC Specification for Design, Fabrication, and Erection of Structural Steel for Buildings,
- 6) Materials of construction: (Unless otherwise noted.)
- a) Structural steel shall be A-36, Fy = 36 ksi.
 - b) Structural steel tubing shall be A-500, Grade B, Fy = 46 ksi.
 - c) Structural aluminum tubing shall be 6053, 6061-T6, or equivalent, Fy = 20 ksi min.
 - d) Structural piping shall be A-53, Grade B, Type E or S, Fy = 35 ksi.
 - e) Anchor bolts shall be A-307 with heavy hex at bottom, not "L" bolts, UNO.
 - f) Connection bolts shall be A-325, snug tight.
 - g) Rebar shall be Grade 60 for #6 or larger, Grade 40 for #5 or smaller.
 - h) Concrete shall be 3000 psi.
- 7) Welding...
- a) Design and fabrication according to AWS D1.1.
 - b) AWS certification required for all structural welders.
 - c) E70XX electrodes for SMAW processes.
 - d) F7X-EXXX electrodes for SAW processes.
- 8) Soil must be verified by sign installer. Bearing capacity 1500 psf and sides 150 psf per ft depth. If there is a question about bearing capacity, a soil test must be performed.
- 9) Sign Column Bending.
- a) 8"x4"x5/16", .291" wall, HSS 46 ksi steel tube column, S = 12.8 in3 (Required S = M / Fb / sf = 56 kip.ft Ult * .7 tw in column * .6 ASD / 46 ksi / .6 = 10.1 in3)
 - b) 16"x12"x1.25" steel base plate. Weld column to top and bottom of base plate with 5/16 fillet weld all around. Weld base plate to torsion tube and 4 - 3/8" x 3"x3" gusset plates with 5/16" fillet weld all around.
- 10) Torsion Tube,
- a) 10"x10"x5/16", .291" wall, HSS 46 ksi steel tube
 - b) Weld Torsion tube to top of 10"x6" HSS existing columns and 5/16" inset end caps with 5/16" fillet weld all around.
- 11) EXISTING FOUNDATION AND EXISTING COLUMNS: This engineering is specifically NOT for the existing foundation and existing columns since we don't know what it is. The sign company said the existing permitted sign is bigger (185ft2) and taller (31.5') than the one they plan to put up so the new sign will put less stress on the existing permitted foundation and columns. Permitting authority should verify foundation and column engineering in existing permit documents.

CERTIFICATION:
I hereby certify that the accompanying
Wind Load Analysis demonstrates
compliance with 2012 IBC
to the best of my knowledge.

LIMITATION: This design is valid for one
sign, at specified location. In case of conflict,
structural requirements, scope of work, and
builder responsibilities control.

MARK DISOSWAY
P.E. 00112774



Tuesday, May 12, 2015

Total Imaging, Inc.

PPE-21839

LOCATION OF SIGN:
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Knoxville, TN

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PRINTED DATE:
Tuesday, May 12, 2015

DRAWN BY: David Disosway	CHECKED BY: Mark Disosway P.E.
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FINALS DATE: 12May15	
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JOB NUMBER:
150454

DRAWING NUMBER
S-1
OF 1 SHEET