

December 23, 2005

Project No. 05-1574



To: GLS Industries
7200 Highway 63 N
Rochester, MN 55906-8978

Attention: Jeffery Price

Subject: Moderra Siding System Analysis, Generic Wainscoat Application

In accordance with the request of your representative (Dustin Boettcher), Mortarless Systems Engineering, Inc. (MSE) has prepared an analysis of a typical wainscoat application (4' high) of the subject siding system.

Based upon a review of the subject system, and the design specifications presented in *National Design Specification (NDS) for Wood Construction*, it is MSE's opinion that the subject system will be stable provided the specific recommendations contained herein this report, and the general construction recommendations of *Moderra's Installation Manual*, are incorporated in wainscoat construction.

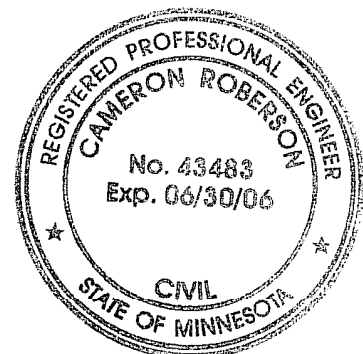
Although the *NDS* is a national recognized standard, there may be instances where the governing authority requires a locally registered engineer to review and approve the attached calculations.

Respectfully,

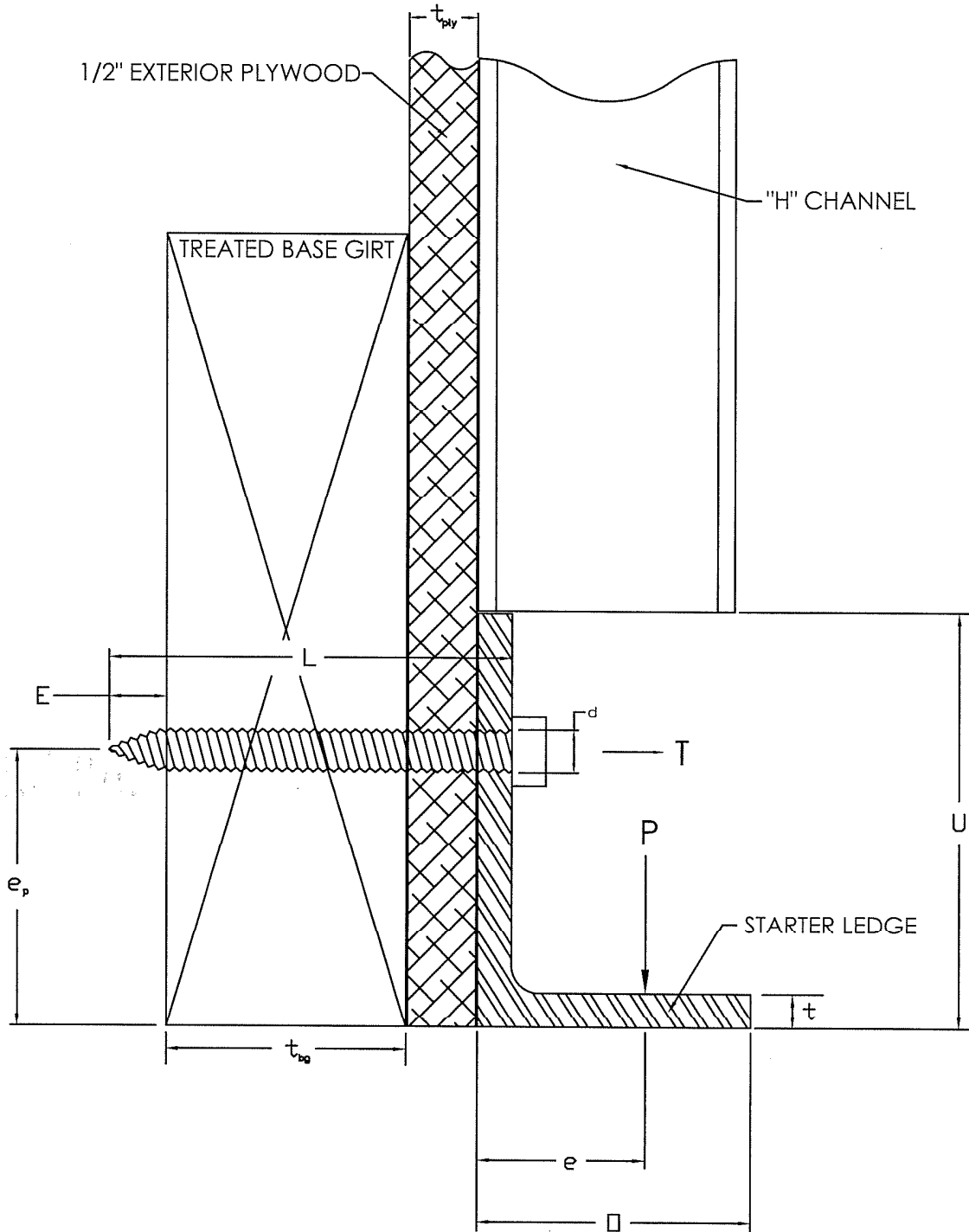
Cameron Roberson, MN 43483, WI 37113-6, IA 17246
President



Enclosed: Figure: *Moderra Stability Analysis*
Calculations (4'0" Wainscoat)



MODERRA STABILITY ANALYSIS



THIS DRAWING IS FURNISHED FOR PRELIMINARY DESIGN PURPOSES ONLY, AND SHOULD NOT BE USED FOR FINAL DESIGN DRAWINGS OR CONSTRUCTION DRAWINGS WITHOUT THE CERTIFICATION OF A PROFESSIONAL ENGINEER REGISTERED IN THE STATE IN WHICH THE WALL WILL BE CONSTRUCTED.

NO.	DATE	REVISION	BY



LEGEND

PROJECT NO.	MODERRA
DESCRIPTION	MODERRA STABILITY ANALYSIS
SHEET NO.	1 OF 1
DATE	02/14/03
ADDRESS	WWW.MSE.COM

12/23/2005

Professional Stability Analysis v.02

GIVEN

C _D	Duration coefficient	0.90
C _m	Moisture coefficient	1
C _{eg}	End grain coefficient	1
C _g	Group Action Factor	1
C _Δ	Geometry Coefficient	1
C _t	Temperature coefficient	1
s	Lag screw spacing (in) (along length of starter ledge)	16
d	Lag screw diameter (in), typ. 3/8" = 0.375"	0.375
L	Lag screw length (in), use only fully threaded screws	2.50
E	Length of tapered tip (in)	0.22
w	unit weight of Moderra (psf)	28
t	Starter ledge thickness (in)	0.25
H	Moderra Wall height (ft)	4.25
F _y	Youngs Modulus for A36 angle iron (psi)	36000
U	Lag up distance (in), typ. 3" or 4"	2
O	Lag out distance (in), typ. 2" or 3"	3
e _p	Pullout moment arm (in), dist from bttm of angle to lag screw, typ. 2"	1
t _{bg}	Thickness of Base Girt (in), typ. 1.75" for 2by6, 2by8, etc.	1.75
t _{ply}	Thickness of plywood (in), typ. 1/2" exterior plywood	0.5
e	Moment arm (in)	0.75

Ab Area of angle iron resisting shear due to bending (in²/ft)

S_x Section modulus of angle iron (in³/ft)

I_x Moment of Inertia of angle iron (in⁴/ft)

V_b Shear capacity of angle iron against bending (lb/ft)

H_{v_o all} Allowable wall height considering V_b (ft)

M_b Moment capacity of angle iron against bending (ft-lb/ft)

H_{mb all} Allowable wall height considering M_b (ft)

D Depth of thread penetration (in), can not exceed t_{bg} + t_{ply}

W Pullout capacity of lag screw from spruce-pine-fir (SPF), (#/in of thread)

W' Modified pullout capacity of lag screw from SPF, (#)

C_d depth coefficient

Z Shear capacity of SPF against lag screw (#)

Z' Modified shear capacity of SPF against lag screw (#/lag screw)

P Wall Load (#/ft)

T Pullout Force on lag screws (#/ft)

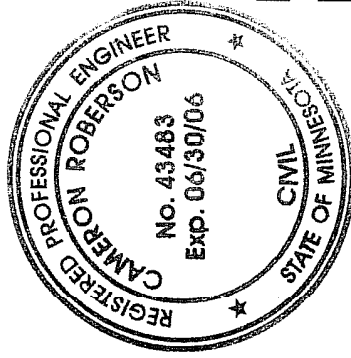
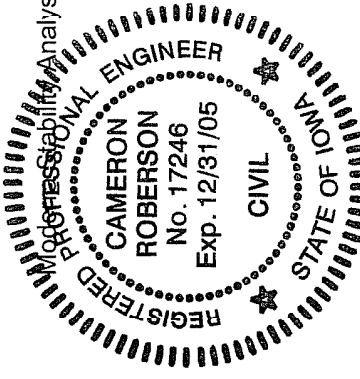
UNITY FORMULA

= (T / W') + (P / Z) <= 1

Cameron Roberson

(T / W') + (P / Z) =

1.00
<= 1
O.K.



0.75

3
0.125
0.016

43200
1543
225
129

O.K.

O.K.

2.03
235
211.50
0.68
450
274
119
119

= lesser of (L-E-t) or (t_{bg} + t_{ply})

= Interpreted from NDS Manual

= W * C_D * C_m * C_t * C_{eg} * D

= D / (8 * d)

= Interpreted from NDS Manual

= Z * C_D * C_m * C_g * C_Δ * C_d * C_{eg}

= w * H

= P * t_e / e_p * (s / 12in)

DERIVED

Moderra Starter Ledge to Base Girt thru Plywood (i.e., Pole Frame Bldg)