H. B. FLEMING, INC.
Contracting & Engineering
89 Pleasant Avenue
South Portland, ME 04106

Phone (207) 799-8514

LETTER OF TRANSMITTAL

DATE 3/27/15

JOB NO.

ATTENTION BRIAN EMMONS

RE: BURKE, VT
BRIDGE #13

TO T-BUCK CONSTRUCTION

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via _____ the following items:

☒ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications

☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
1	3/27/15	1	REVISED PILE SUBMITTAL

THESE ARE TRANSMITTED as checked below:

☒ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval

☐ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution

☐ As requested ☐ Returned for corrections ☐ Return _____ corrected prints

☐ For review and comment ☐ _____

☐ FOR BIDS DUE _____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS

BRIAN,
ATTACHED IS OUR REVISED PILE SUBMITTAL

COPY TO _____

SIGNED: [signature]

If enclosures are not as noted, kindly notify us at once.

H.B. FLEMING, INC.

CONTRACTING · ENGINEERING

89 Pleasant Ave. South Portland, ME 04106

Phone 207-799-8514 Fax 207-799-8538

www.hbfleming.com

PILE DRIVING BRIDGES SUBMARINE PIPELINES

SUBMITTAL

Submitted To:

Client: T-Buck Construction
Attention: Brian Emmons

Date: 03/27/2015
Project: Bridge #13
Location: Burke, VT

Subject: Pile Driving Criteria

H.B. Fleming Proposes to use the following driving criteria for the piles to be installed at the above location.

Hammer(s)

- Either an APE D-19 or an MKT DE 42 will be used for this project. The details for each hammer are listed below respectfully.
- The APE D-19 has a ram weight of 4,190 lbs, a maximum stroke of 10-2", and a rated energy of 42,800 ft-lbs.
- The MKT DE-42 has a ram weight of 4,200 lbs, a maximum stroke of 10'6", and a rated energy of 42,000 ft-lbs.
- The hammer cushioning material consists of 2 inches of Monocast MC901 material for both hammers.

Pile

- HP 12x63 ASTM A572 Gr. 50 steel piles
- The Nominal Pile Driving Resistance, which we based our analysis on is 268 kips (134 tons).
- Piles will be fitted with cast steel driving points

Results

- Piles will be driven until a blow count of 2 blows per inch for 3 consecutive inches is obtained with the APE D19-42, and reach a minimum tip elevation of 16 feet below the bottom of the proposed abutment pile cap. If abrupt refusal is encountered, piles will be driven for 2 blows for any ½" of movement, or 2 blows with no movement. It is anticipated that piles will be driven to rock.
- Piles will be driven until a blow count of 3 blows per inch for 3 consecutive inches is obtained with the MKT DE 42, and reach a minimum tip elevation of 16 feet below the bottom of the proposed abutment pile cap. If abrupt refusal is encountered, piles will be

driven for 3 blows for any ½" of movement, or 3 blows with no movement. It is anticipated that piles will be driven to rock.

- These criteria are based upon the output generated from the WEAP analysis that follows. PDA testing of driven piles will determine whether the above criteria are used throughout the project or if any adjustments need to be made.
- In almost every case, dynamic testing results are what driving criteria are based upon.
- HB Fleming assumes the risk that if either hammer chosen for the project does not meet the 2011 VTrans Section 504.02 specification that we will provide a hammer that meets this requirement. Furthermore, we believe that dynamic testing will show that either hammer listed will meet this requirement.
- A saximeter will be provided by HB Fleming for this project to monitor the driving process at each substructure.

Signed: _____

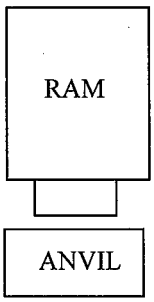
John Allen

H.B. FLEMING PILE EQUIPMENT DATA SHEET

Project: Bridge No. 13
Location: Burke, VT

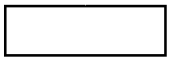
Date: 03/27/2015
Client: T-Buck Construction

HAMMER



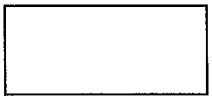
Manufacturer:	APE
Model:	D-19
Type:	Single Acting Diesel
Length of Stroke:	10' - 2"
Rated Energy at Given Stroke:	42,800 ft-lb
Modifications:	None

HAMMER CUSHION



Material:	Monocast MC901
Thickness:	2"
Area:	283.5 in^2
Modulus of Elasticity:	285 ksi
Coefficient of Restitution:	0.8

DRIVE HEAD

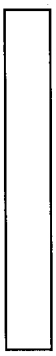


Weight:	1200 lb

PILE CUSHION

Cushion Material:	N/A
Thickness:	N/A
Modulus of Elasticity:	N/A
Coefficient of Restitution:	N/A

PILE



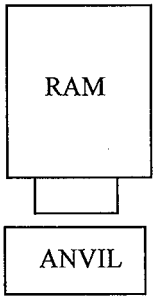
Pile Type:	HP 12x63
Length in Leads:	Up to 65'
Weight/LF:	63 lb
Wall Thickness:	0.515"
Taper:	N/A
Cross Sectional Area:	18.4 in^2
Ultimate Capacity	268 kips
Splice Description:	Full Penetration Butt Weld
Tip Treatment Description:	Cast Steel Point

H.B. FLEMING PILE EQUIPMENT DATA SHEET

Project: Bridge No. 13
Location: Burke, VT

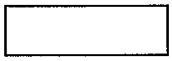
Date: 03/27/2015
Client: T-Buck Construction

HAMMER



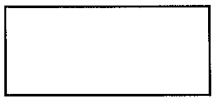
Manufacturer:	MKT
Model:	DE-42
Type:	Single Acting Diesel
Length of Stroke:	10' - 6"
Rated Energy at Given Stroke:	42,000 ft-lb
Modifications:	None

HAMMER CUSHION



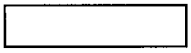
Material:	Monocast MC901
Thickness:	2"
Area:	283.5 in^2
Modulus of Elasticity:	285 ksi
Coefficient of Restitution:	0.8

DRIVE HEAD



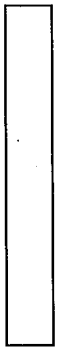
Weight:	1200 lb

PILE CUSHION



Cushion Material:	N/A
Thickness:	N/A
Modulus of Elasticity:	N/A
Coefficient of Restitution:	N/A

PILE

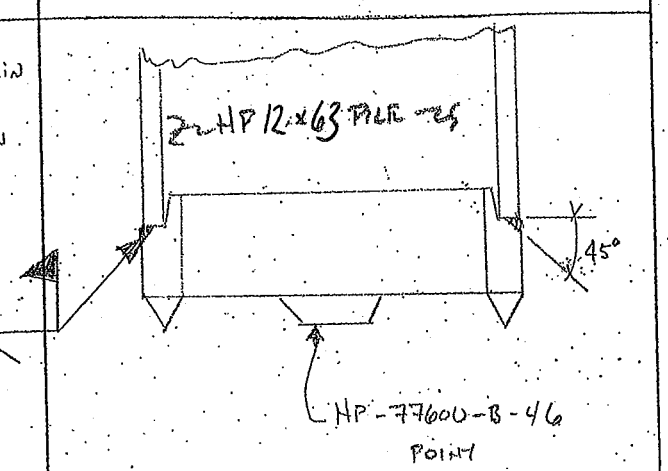


Pile Type:	HP 12x63
Length in Leads:	Up to 65'
Weight/LF:	63 lb
Wall Thickness:	0.515"
Taper:	N/A
Cross Sectional Area:	18.4 in^2
Ultimate Capacity	268 kips
Splice Description:	Full Penetration Butt Weld
Tip Treatment Description:	Cast Steel Point

JOINT WELDING PROCEDURE SPECIFICATION

Material specification: PILE = ASTM A572 GR. 50 / EQUIVALENT ; POINT = ASTM A27 65/35
Welding process: SMAW
Manual or machine: MANUAL
Position of welding: HORIZONTAL OR VERTICAL
Filler metal specification: AWS A5.1
Filler metal classification: E7018
Flux: N/A
Shielding gas: N/A Flow rate: N/A
Single or multiple pass: MULTIPLE (IF REQUIRED)
Single or multiple arc: SINGLE
Welding current: D/C
Polarity: REVERSE
Welding progression: N/A
Root treatment: NONE - POINTS ARE PRE-BEVELED TO PROFILE
Preheat and interpass temperature: PER AWS D1.5
Postheat treatment: NONE

WELDING PROCEDURE

Pass. no.	Electrode size	Welding current: Amperes	Welding current: Volts	Travel speed	Joint detail
1	1/8"	120-150	12-24	1 Ft/min	
2+	5/32"	140-180	12-24	1 Ft/min	

This procedure may vary due to fabrication sequence, fit-up, pass size, etc., within the limitation of variables given in Section 5.

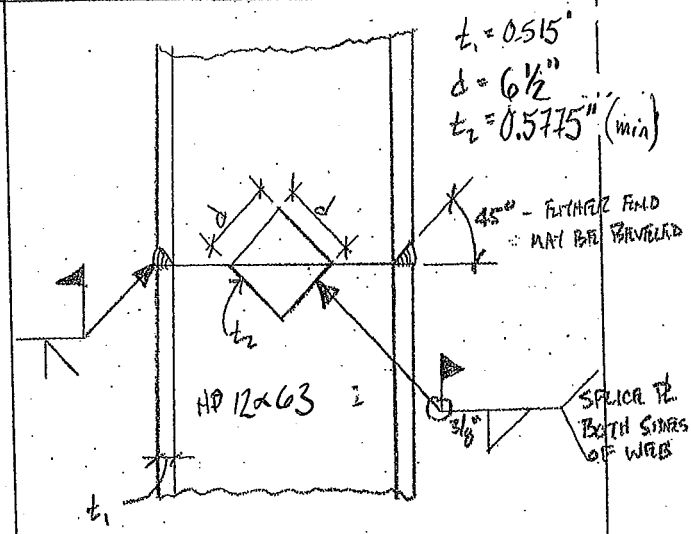
Procedure no. VAOT HP 12x63 POINT ATTACHMENT Contractor H.B. FLEMING
Revision no. ϕ Authorized by [signature]
Form E-2 Date 02/18/15

JOINT WELDING
PROCEDURE SPECIFICATION

Material specification ASTM A572 GR. 50 / EQUIVALENT
Welding process SMAW
Manual or machine MANUAL
Position of welding HORIZONTAL
Filler metal specification AWS A5.1
Filler metal classification E7018
Flux N/A
Shielding gas N/A Flow rate N/A
Single or multiple pass MULTIPLE IF REQUIRED
Single or multiple arc SINGLE
Welding current D/C
Polarity REVERSE
Welding progression N/A
Root treatment GRIND / BEVEL TO PROFILE
Preheat and interpass temperature PER AWS D1.5
Postheat treatment NONE

WELDING PROCEDURE

Pass no.	Electrode size	Welding current		Travel speed	Joint detail
		Amperes	Volts		
1	1/8"	120-150	12-24	1 FT/MIN	
2+	5/32"	140-180	12-24	1 FT/MIN	



This procedure may vary due to fabrication sequence, fit-up, pass size, etc., within the limitation of variables given in Section 5.

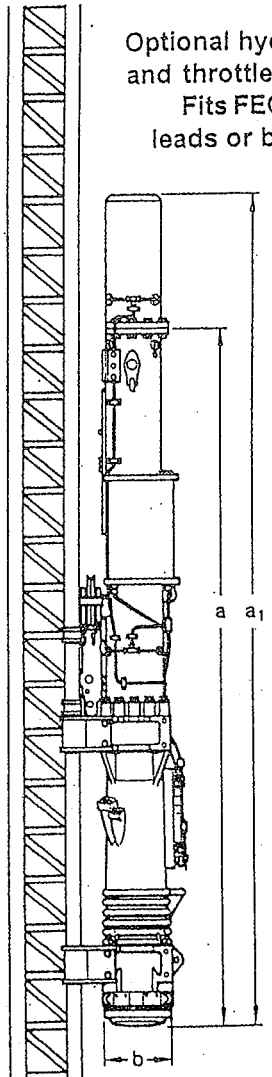
Procedure no. VAGT WEB DIAMOND SPLICE
Contractor H.B. FLEMING, INC.
Revision no. ∅
Authorized by [signature]
Date 02/18/15

Form E-2

Form E-2 — Welding Procedure Specification

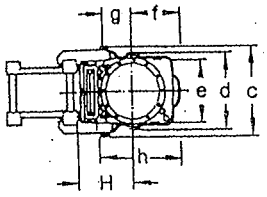
APE/SEMW Model D19-42 Single Acting Impact Hammer

operates on diesel or bio-diesel for all types of impact pile driving



Optional hydraulic trip and throttle available. Fits FEC tube leads or box type.

Direct drive available



MODEL D19-42 (1.9 metric ton ram)

SPECIFICATIONS

Maximum Rated energy	42,800 ft-lbs
Minimum rated energy	16,000 ft-lbs
Stroke at rated energy	10 feet 2 inches
Maximum obtainable stroke	10 feet 3 inches
Speed (blows per minute)	37-53

WEIGHTS

Ram	4190 lbs
Anvil	754 lbs
Hammer weight (includes trip device)	7,800 lbs
Typical operating (weight with drive cap)	9,600 lbs

CAPACITIES

Fuel tank (runs on diesel or bio -diesel)	8.5 gal
Oil tank	2.4 gal

CONSUMPTION

Diesel or Bio-diesel fuel	1.5 gal/hr
Lubrication	2.4 gal/hr
Grease	twice per day

DIMENSIONS OF HAMMER

a_1	Length overall	186.2 inches
a	Length over cylinder extension	219. 3 inches
b	Impact block diameter	17.3 inches
c	Width over bolts	22 inches
d	Hammer width overall	19 inches
e	Width for guiding- face to face	12.5 inches
f	Hammer center to pump guard	13.5 inches
g	Hammer center to bolt center	13.6 inches
h	hammer depth overall	26.2 inches
H	Minimum clearance for leads	14.2 inches

We reserve the right to modify specifications without notice. Contact APE directly for updated literature.

Features

Fuel injection designed by APE engineers
Fuel and lube pumps with 50% less parts than ICE
Hardened piston needs no high maintenance wear rings
Direct drive available for maximum production on steel piles
Fuel pump mounted where heat will not harm it
Variable mechanical cam fuel pump- no air pistons or rings
Optional hydraulic variable fuel remote control
Heavy duty trip system for years of fault free operation
Chrome rings for super long life
Low maintenance and extremely low parts pricing
German design at a reasonable price
Two year APE warranty

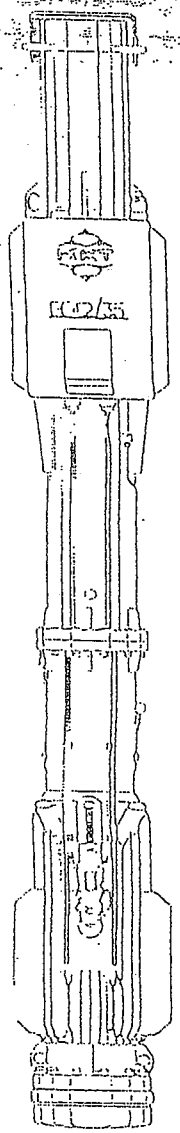
AMERICAN PILEDRIVING EQUIPMENT, INC. APE

SHANGHAI JINTAI CO., LTD.
Shanghai Engineering Machinery Works

APE Corporate Offices
7032 South 196th
Kent, Washington 98032 USA
(800) 248-8498 & (253) 872-0141
(253) 872-8710 Fax

4/99

Visit our WEB site:
www.apevibro.com
e-mail: ape@apevibro.com



INTRODUCING THE NEW

DE42/35

MAXIMUM DIESEL HAMMER FLEXIBILITY FITTING IN 8 x 20 LEADS WITH RAM WEIGHTS TO 4,200 LBS.

ONE HAMMER...-MULTIPLE RAM SIZES... AND ENERGY RANGES. ANOTHER MKT FIRST PROVIDING THE CONTRACTOR WITH HAMMER SIZE FLEXIBILITY AND REDUCED EQUIPMENT INVESTMENT COSTS. MKT DIESEL HAMMERS CONTINUE TO OFFER FEATURES WHICH INSURE DEPENDABLE AND PRODUCTIVE OPERATION. USING EITHER STANDARD OR REMOTE FUEL DELIVERY SYSTEMS.

SPECIFICATIONS DE-42/35		
RAM-PISTON WEIGHT (LBS.)	3,500	4,200
ENERGY RATING (FT.LBS.)	35,000	42,000
BEARING BASED ON ENGINEERING NEWS FORMULA (TONS)	230	230
MAXIMUM OBTAINABLE STROKE	8'-6"	10'-6"
OVERALL LENGTH WITH DRIVE CAP	16'-7"	16'-7"
WEIGHT, HAMMER ONLY (LBS.)	8,600	9,300
WEIGHT, HAMMER AND UNIVERSAL DRIVE CAP (LBS.)	9,550	10,250

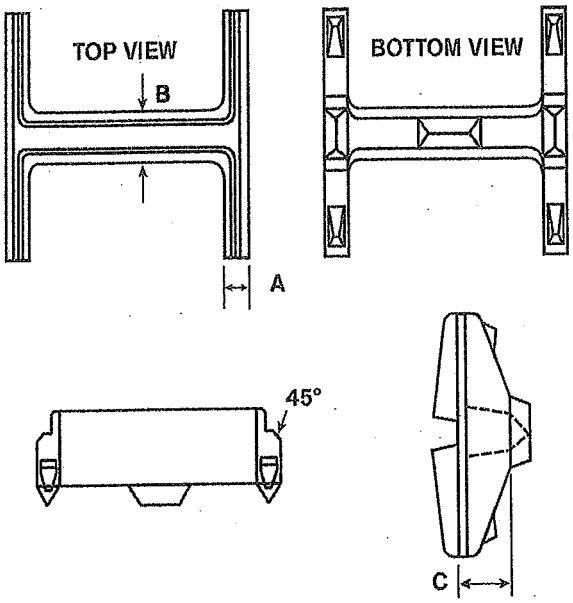
PUBLISHED ENERGY RATINGS ARE EQUAL TO RAM WEIGHT X 10.0 FT. RAM STROKE. ACTUAL ENERGIES DELIVERED ARE A FUCTION OF THE OVERALL JOB CONDITIONS. BEARING RATINGS ARE BASED UPON ENGINEERING NEWS FORMULA, PILE SET EQUAL TO 0.1 BLOW.

PRODUCT LIST

- SINGLE ACTING DIESEL PILE HAMMERS
- AIR PILE HAMMERS
- VIBRATORY PILE DRIVERS/EXTRACTORS
- VIBRATORY HAMMER ACCESSORIES
- PILE DRIVING LEAD SYSTEMS
- CUSTOM ENGINEERED PRODUCTS
- DOUBLE ACTING DIESEL PILE HAMMERS
- DRIVE CAPS AND ACCESSORIES
- HYDRAULIC POWER UNITS
- HYDRAULIC AUGER SYSTEMS
- BOTTOM BRACES
- LEAD ACCESSORIES

HARD-BITE™ – HP-77600-B 30#

Dimensions



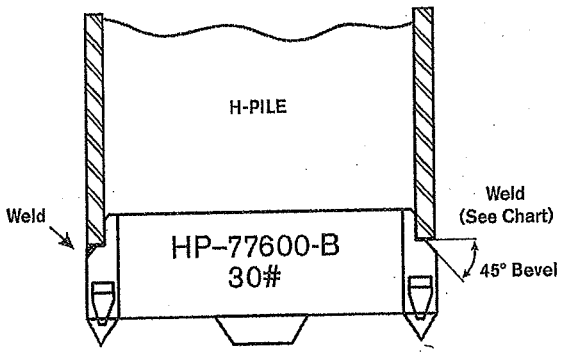
MATERIAL: CAST STEEL

ASTM A148 90/60

	12"
A	1"
B	1-5/16"
C	3"
Wt.	31#

Installation Instructions

1. Fit point onto the end of the square cut pile end.
2. Weld point to the pile in either flat or vertical position using E7018 electrodes.
3. Weld across full width of flange following chart below for minimum size weld.



Pile Size	Flange Thickness	Groove Weld
HP 12 x 84	.685	3/8
x 74	.610	3/8
x 63	.515	5/16
x 53	.435	5/16

ASSOCIATED PILE & FITTING

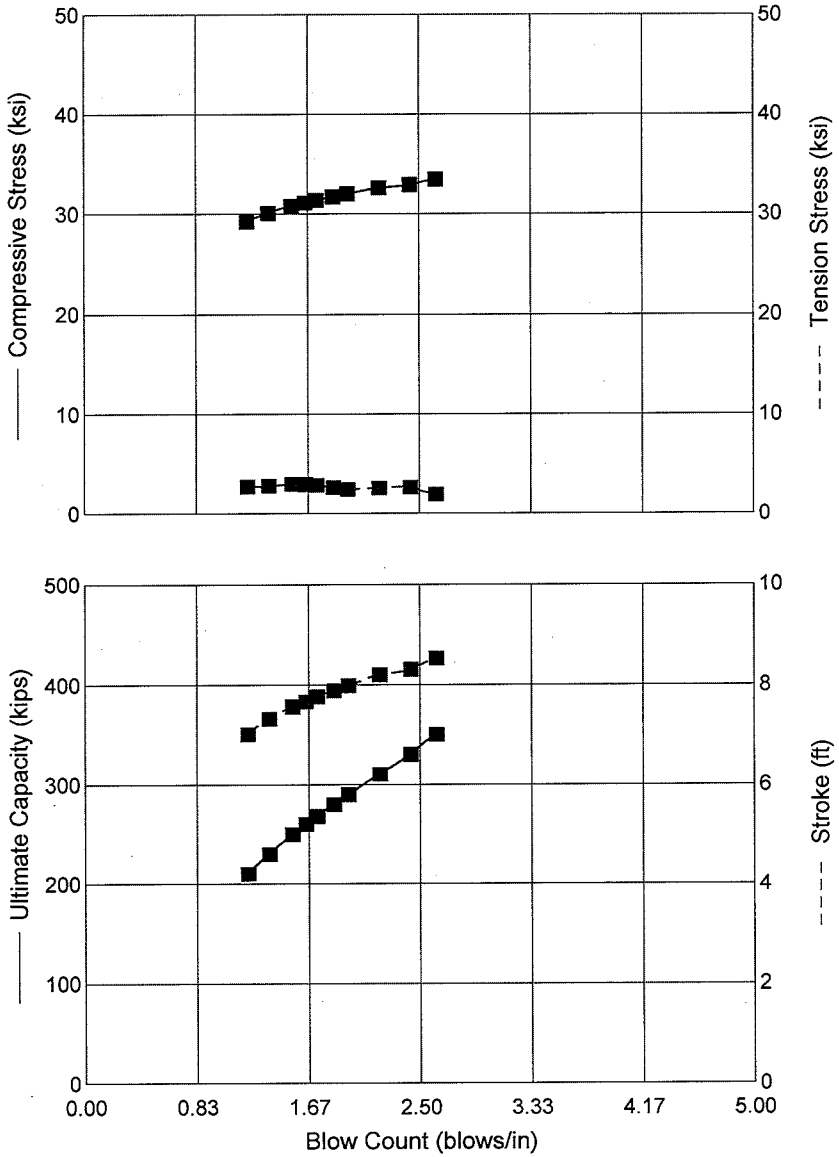
PO Box 5933 Parsippany, NJ 07054-5933
Tel: 973-773-8400
Fax: 973-428-5146
email: apf@associatedpile.com
www.associatedpile.com
Call Toll Free: 800-526-9047

(12/11)

H.B. FLEMING
Burke, VT

19-Feb-2015
GRLWEAP (TM) Version 2005

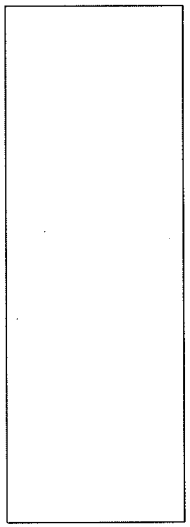
APE D19-42 Variable Capacity



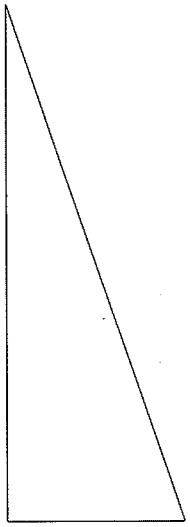
APE D 19-42

Efficiency	0.800	
Helmet	1.20	kips
Hammer Cushion	40399	kips/in
Skin Quake	0.100	in
Toe Quake	0.100	in
Skin Damping	0.050	sec/ft
Toe Damping	0.040	sec/ft
Pile Length	55.00	ft
Pile Penetration	55.00	ft
Pile Top Area	18.40	in2

Pile Model



Skin Friction Distribution



Res. Shaft = 25 %
(Proportional)
2-Pile Analysis
Only Show 1st Pile

APE D19-42 VARIABLE CAPACITY

H.B. FLEMING
Burke, VT

19-Feb-2015
GRLWEAP (TM) Version 2005

Ultimate Capacity kips	Maximum Compression Stress ksi	Maximum Tension Stress ksi	Blow Count blows/in	Stroke ft	Energy kips-ft
210.0	29.15	2.72	1.2	7.01	22.13
230.0	30.03	2.80	1.4	7.32	22.31
250.0	30.77	2.96	1.6	7.56	22.38
260.0	31.06	2.94	1.6	7.66	22.32
268.0	31.31	2.86	1.7	7.76	22.36
280.0	31.67	2.64	1.9	7.88	22.34
290.0	31.96	2.45	2.0	7.98	22.36
310.0	32.53	2.57	2.2	8.19	22.41
330.0	32.86	2.63	2.4	8.30	22.39
350.0	33.39	1.94	2.6	8.52	22.56

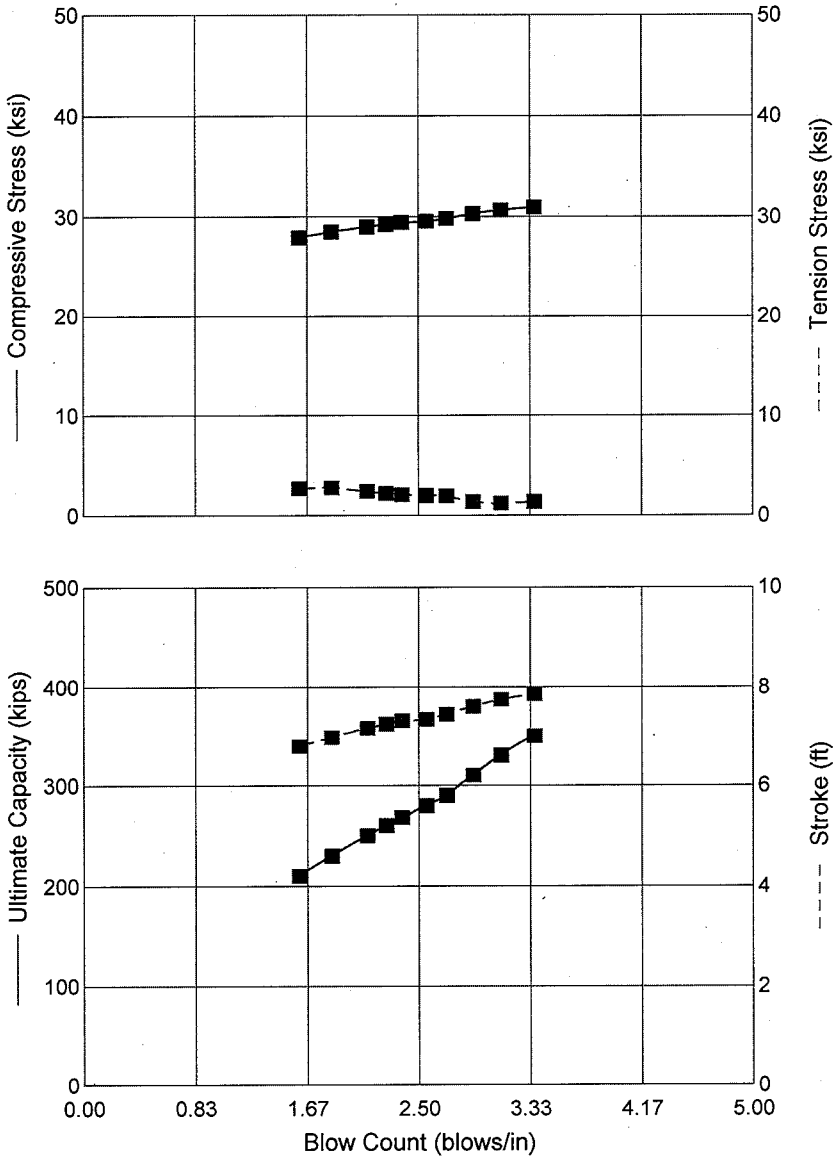
- PDA TESTING WILL BE DONE AND WILL DICTATE THE PILE DRIVING CRITERIA.

- HB FLEMING ASSUMES THE RISK THAT IF THIS HAMMER IS USED AND DOES NOT MEET THE SECTION 504.02(b) STANDARD, WE WILL SWAP HAMMERS AT HBF EXPENSE.

H.B. FLEMING
Burke, VT

19-Feb-2015
GRLWEAP (TM) Version 2005

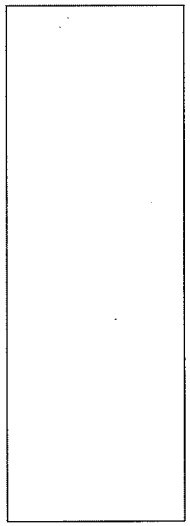
MKT DE42 VARIABLE CAPACITY



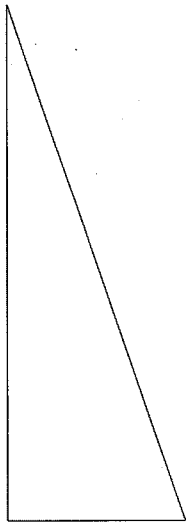
MKT DE 42/35

Efficiency	0.800	
Helmet	1.20	kips
Hammer Cushion	40399	kips/in
Skin Quake	0.100	in
Toe Quake	0.100	in
Skin Damping	0.050	sec/ft
Toe Damping	0.040	sec/ft
Pile Length	55.00	ft
Pile Penetration	55.00	ft
Pile Top Area	18.40	in2

Pile Model



Skin Friction Distribution



Res. Shaft = 25 %
(Proportional)
2-Pile Analysis
Only Show 1st Pile

MKT DE42 VARIABLE CAPACITY

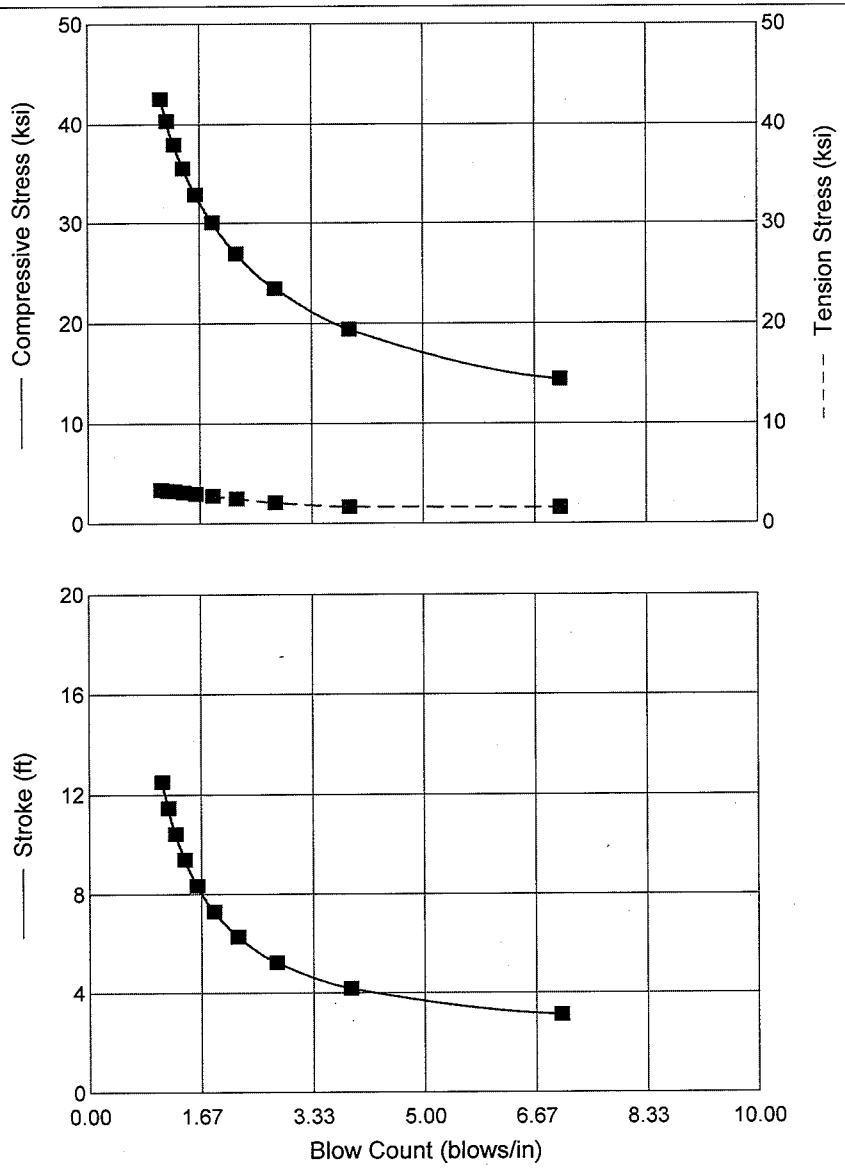
H.B. FLEMING
Burke, VT

19-Feb-2015
GRLWEAP (TM) Version 2005

Ultimate Capacity kips	Maximum Compression Stress ksi	Maximum Tension Stress ksi	Blow Count blows/in	Stroke ft	Energy kips-ft
210.0	27.86	2.69	1.6	6.79	17.74
230.0	28.44	2.75	1.8	6.97	17.74
250.0	28.95	2.41	2.1	7.16	17.73
260.0	29.20	2.20	2.3	7.24	17.72
268.0	29.40	2.05	2.4	7.31	17.75
280.0	29.51	1.98	2.6	7.34	17.67
290.0	29.75	1.92	2.7	7.44	17.68
310.0	30.26	1.35	2.9	7.60	17.84
330.0	30.63	1.18	3.1	7.74	17.88
350.0	30.90	1.36	3.4	7.85	17.90

H.B. FLEMING
Burke, VT

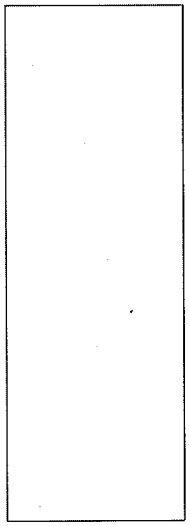
19-Feb-2015
GRLWEAP (TM) Version 2005



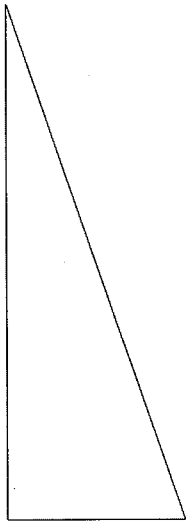
APE D 19-42

Capacity	268.0	kips
Efficiency	0.800	
Helmet	1.20	kips
Hammer Cushion	40399	kips/in
Skin Quake	0.100	in
Toe Quake	0.100	in
Skin Damping	0.050	sec/ft
Toe Damping	0.040	sec/ft
Pile Length	55.00	ft
Pile Penetration	55.00	ft
Pile Top Area	18.40	in2

Pile Model



Skin Friction Distribution



Res. Shaft = 25 %
(Proportional)
2-Pile Analysis
Only Show 1st Pile

APE D19-42 Constant Capacity

ABE 019-42 CONSTANT CAPACITY

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Ultimate Capacity kips	Maximum Compression Stress ksi	Maximum Tension Stress ksi	Blow Count blows/in	Stroke ft	Energy kips-ft
268.0	14.40	1.60	7.0	3.12	7.39
268.0	19.39	1.68	3.9	4.17	10.87
268.0	23.43	2.09	2.8	5.21	14.29
268.0	26.92	2.48	2.2	6.25	17.60
268.0	30.02	2.76	1.9	7.29	20.85
268.0	32.88	2.97	1.6	8.33	24.12
268.0	35.51	3.11	1.4	9.38	27.33
268.0	37.93	3.23	1.3	10.42	30.41
268.0	40.28	3.28	1.2	11.46	33.43
268.0	42.49	3.37	1.1	12.50	36.40

H.B. FLEMING
Burke, VT

19-Feb-2015
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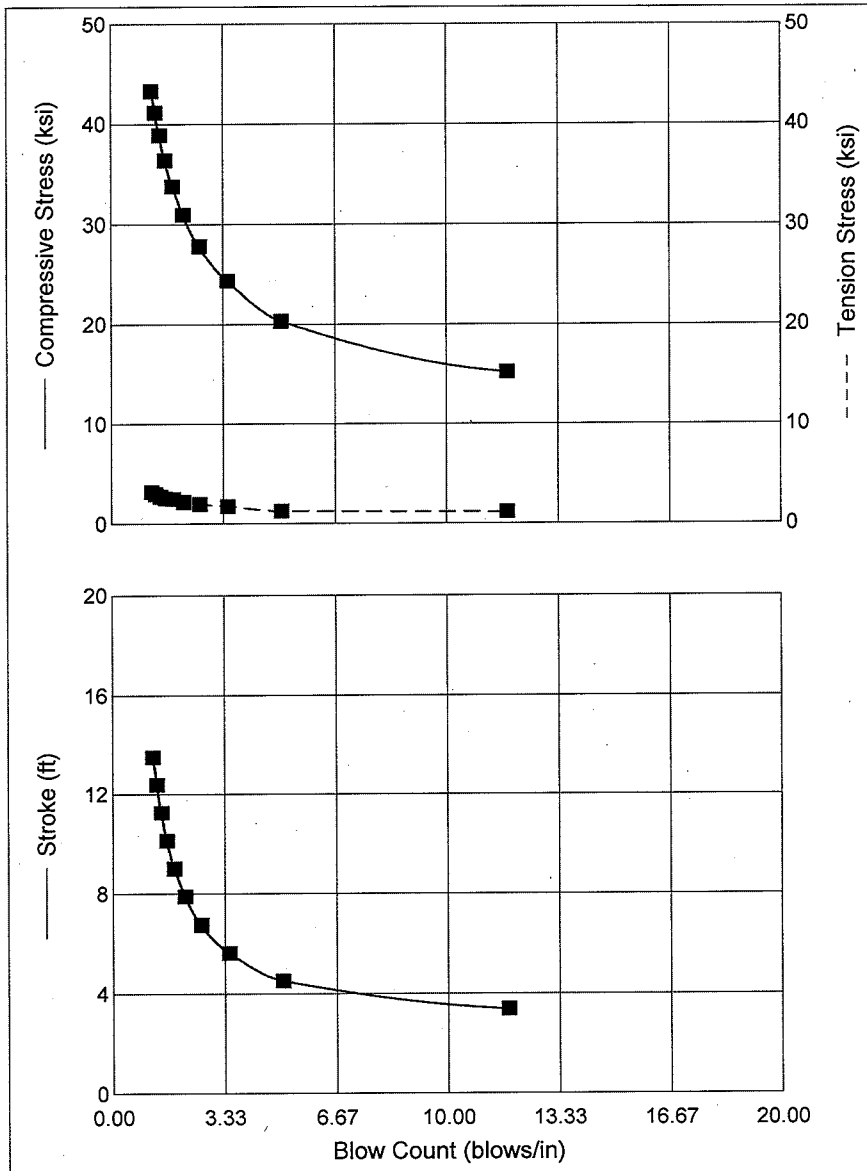
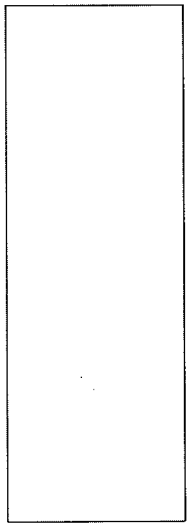


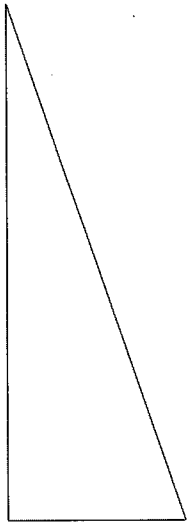
MKT DE 42/35

Capacity	268.0	kips
Efficiency	0.800	
Helmet	1.20	kips
Hammer Cushion	40399	kips/in
Skin Quake	0.100	in
Toe Quake	0.100	in
Skin Damping	0.050	sec/ft
Toe Damping	0.040	sec/ft
Pile Length	55.00	ft
Pile Penetration	55.00	ft
Pile Top Area	18.40	in2

Pile Model



Skin Friction Distribution



Res. Shaft = 25 %
(Proportional)
2-Pile Analysis
Only Show 1st Pile

MKT DE 42 Constant Capacity

MKT DE42 Constant Capacity

H.B. FLEMING
Burke, VT

19-Feb-2015
GRLWEAP (TM) Version 2005

Ultimate Capacity kips	Maximum Compression Stress ksi	Maximum Tension Stress ksi	Blow Count blows/in	Stroke ft	Energy kips-ft
268.0	15.19	1.16	11.8	3.38	5.88
268.0	20.27	1.26	5.1	4.50	9.38
268.0	24.32	1.73	3.5	5.62	12.77
268.0	27.80	1.97	2.6	6.75	16.15
268.0	30.92	2.17	2.2	7.88	19.39
268.0	33.77	2.47	1.8	9.00	22.59
268.0	36.35	2.54	1.6	10.12	25.74
268.0	38.85	2.72	1.5	11.25	28.89
268.0	41.11	2.96	1.3	12.38	32.02
268.0	43.28	3.18	1.2	13.50	35.13