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

Phone (207) 799-8514

LETTER OF TRANSMITTAL

DATE 2/12/2016 JOB NO.

ATTENTION Marc Boudreau

RE: Clarendon Pile Submittal

TO J.A. McDonald Inc.

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	2/12/2016		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

Marc,

We have revised our pile submittal to reflect the states comments. Please let us know if you have any questions.

Thanks,
Dale

COPY TO _____

SIGNED: _____

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: J.A. McDonald, Inc.
Attention: Marc Boudreau

Date: 2/12/2016
Project: Clarendon BRO 1443(48)
Location: Clarendon, 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

- Either an APE D19-42 single acting open ended diesel pile hammer or an MKT DE-42 single acting open ended diesel pile hammer will be used to drive the piles. The D19 has a ram weight of 4,190 Lbs, a max stroke of 10'-3", and a rated energy of 42,800 ft-lbs. The DE-42 has a ram weight of 4,200 lbs, a max stroke of 10'-6" and a rated energy of 42,000 ft-lbs.
- The D19 will be operated on fuel setting 3
- Both hammers use Monocast MC 901 pile cushions

Pile

- HP12X63 ASTM A572 Gr. 50 steel piles
- The nominal capacity which we based our analysis on is 310 kips (155 tons)
- Piles will be fitted with cast steel driving points

Results

- Piles will be driven until a blow count of 5 for three consecutive inches is obtained at a stroke of 8.11 ft for the MKT DE-42 or 8.08 ft for the APE D19.
- If abrupt refusal is encountered, piles will be driven for 5 blows for 1/2 inch of movement or 3 blows for no movement
- These criteria are based upon the output generated from the WEAP analysis that follows.

Signed: _____

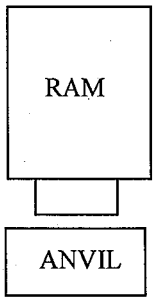
Dale Lawrence

H.B. FLEMING PILE EQUIPMENT DATA SHEET

Project: Clarendon BRO 1443 (48)
Location: Clarendon, VT

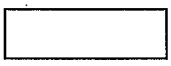
Date: 2/12/2016
Client: J.A. McDonald

HAMMER



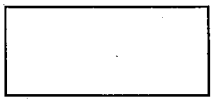
Manufacturer:	APE
Model:	D-19
Type:	Single Acting Diesel
Length of Stroke:	10' - 3"
Rated Energy at Given Stroke:	42,800 ft-lb
Modifications:	None

HAMMER CUSHION



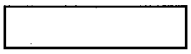
Material:	Monocast MC901
Thickness:	2"
Area:	283.5 in^2
Modulus of Elasticity:	285 ksi
Coefficient of Restitution:	0.8

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

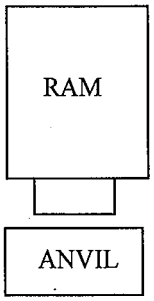
Pile Type:	HP 12x63
Length in Leads:	Up to 65'
Weight/LF:	63 lb
Wall Thickness:	.515"
Taper:	N/A
Cross Sectional Area:	18.4 in^2
Ultimate Capacity	310 kips
Splice Description:	VAOT Web Diamond Splice
Tip Treatment Description:	Cast Steel Point

H.B. FLEMING PILE EQUIPMENT DATA SHEET

Project: Clarendon BRO 1443 (48)
Location: Clarendon, VT

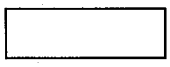
Date: 2/12/2016
Client: J.A. McDonald

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

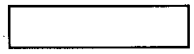


Material:	Monocast MC901
Thickness:	2"
Area:	283.5 in^2
Modulus of Elasticity:	285 ksi
Coefficient of Restitution:	0.8

DRIVE HEAD

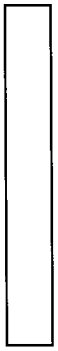
Weight:	1200 lb

PILE CUSHION



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

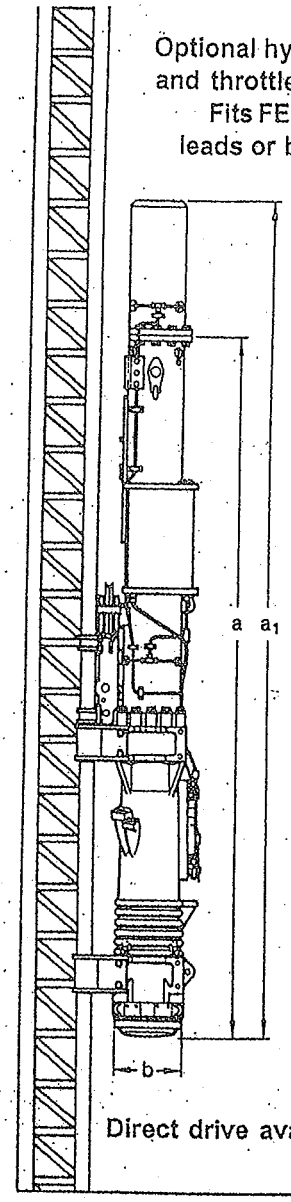
PILE



Pile Type:	HP 12x63
Length in Leads:	Up to 65'
Weight/LF:	63 lb
Wall Thickness:	.515"
Taper:	N/A
Cross Sectional Area:	18.4 in^2
Ultimate Capacity	310 kips
Splice Description:	VAOT Web Diamond Splice
Tip Treatment Description:	Cast Steel Point

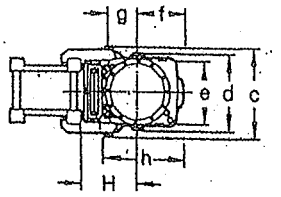
APE/SEMW Model D19-42 Single Acting Impact Hammer

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

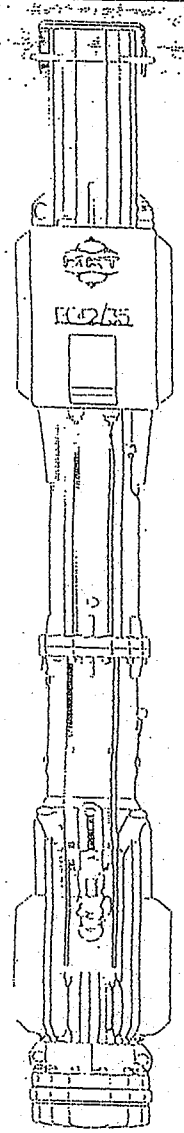
AMERICAN PILEDRIVING EQUIPMENT INC. APE

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

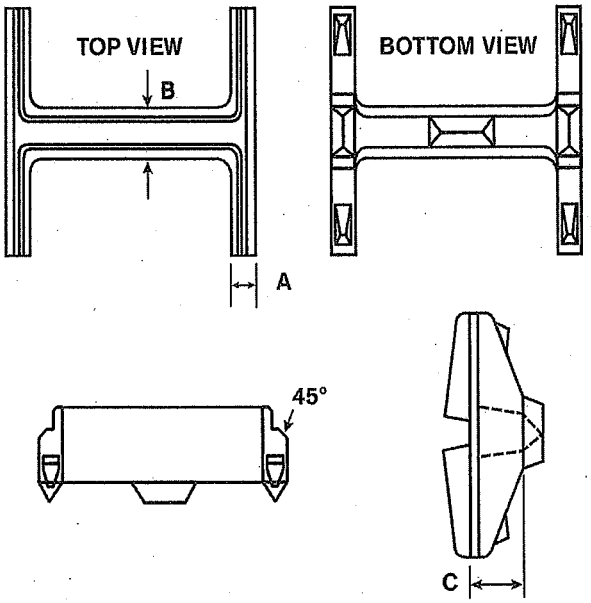
PUBLISHED ENERGY RATINGS ARE EQUAL TO RAM WEIGHT X 10.0 FT. RAM STROKE. ACTUAL ENERGIES DELIVERED ARE A FUNCTION OF THE OVERALL JOB CONDITIONS. BEARING RATINGS ARE BASED UPON ENGINEERING NEWS FORMULA, PILE SET EQUAL TO 0.1 IN/BLOW.

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



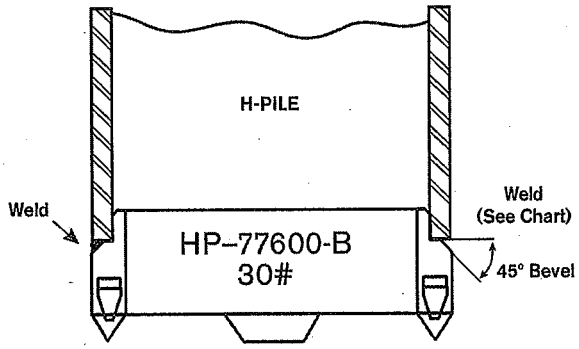
MATERIAL: CAST STEEL

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

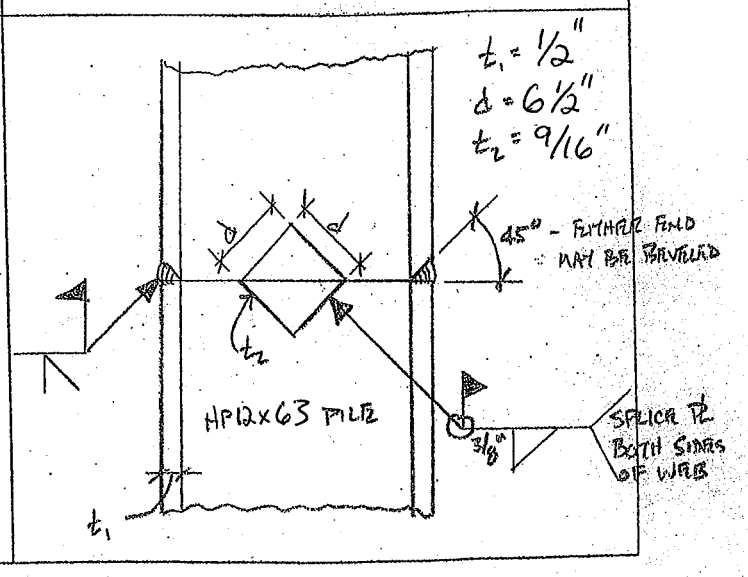
(12/11)

JOINT WELDING
PROCEDURE SPECIFICATION

Material specification ASTM A572 Gr. 50 / EQUIVALENT
Welding process SMAW
Manual or machine MANUAL
Position of welding horizontal, vertical, overhead
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 CLEAN to bare, shiny metal free of contaminants and moisture
Preheat and interpass temperature 50°F unless base metal is below 32°F, then 70°F
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	



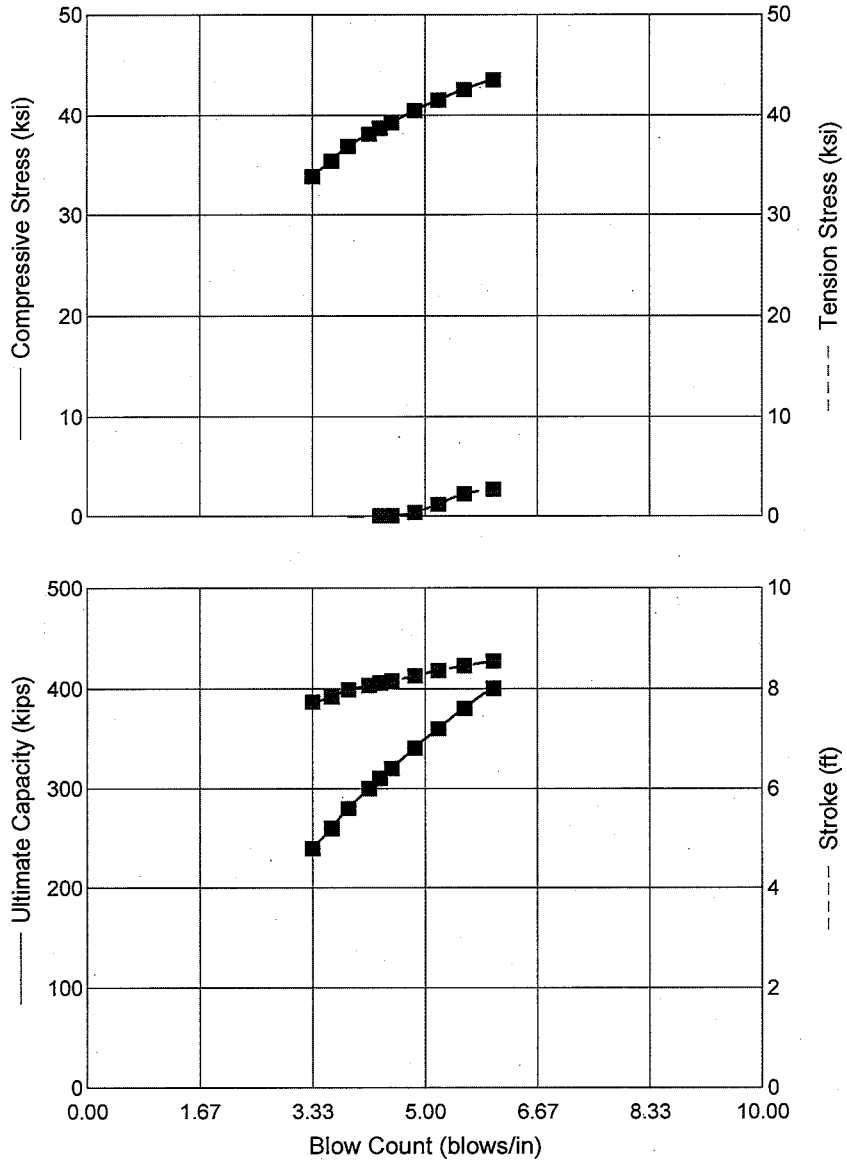
This procedure may vary due to fabrication sequence, fit-up, pass size, etc., within the limitation of variables given in Section 5.

Procedure no. VAGT WEB DIAMOND SPLICE
Contractor H.B. FLEMING, INC.
Revision no. ∅
Authorized by [signature]
Form E-2
Date

Form E-2 — Welding Procedure Specification

H.B. FLEMING
Clarendon BRO 1443(48)

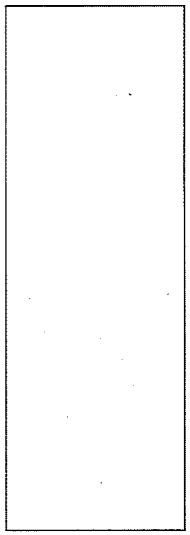
12-Feb-2016
GRLWEAP (TM) Version 2005



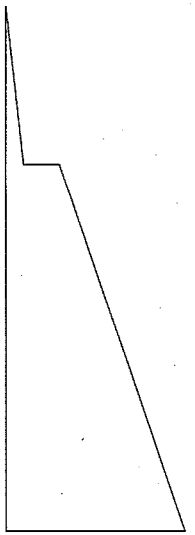
MKT DE 42/35

Efficiency	0.700	
Helmet	1.20	kips
Hammer Cushion	40399	kips/in
Skin Quake	0.100	in
Toe Quake	0.040	in
Skin Damping	0.050	sec/ft
Toe Damping	0.150	sec/ft
Pile Length	20.00	ft
Pile Penetration	20.00	ft
Pile Top Area	18.40	in2

Pile Model



Skin Friction Distribution



Res. Shaft = 14 %
(Proportional)

NKT DE42 Variable Capacity

MKT DEH2 Variable Capacity

H.B. FLEMING
Clarendon BRO 1443(48)

12-Feb-2016
GRLWEAP (TM) Version 2005

Ultimate Capacity kips	Maximum Compression Stress ksi	Maximum Tension Stress ksi	Blow Count blows/in	Stroke ft	Energy kips-ft
240.0	33.82	0.00	3.3	7.73	14.08
260.0	35.36	0.00	3.6	7.83	14.03
280.0	36.84	0.00	3.9	7.98	14.20
300.0	38.07	0.00	4.2	8.06	14.16
310.0	38.67	0.06	4.3	8.11	14.15
320.0	39.21	0.06	4.5	8.15	14.10
340.0	40.47	0.39	4.8	8.25	14.11
360.0	41.52	1.21	5.2	8.36	14.12
380.0	42.60	2.24	5.6	8.45	14.17
400.0	43.56	2.72	6.0	8.54	14.19

H.B. FLEMING
Clarendon BRO 1443(48)

12-Feb-2016
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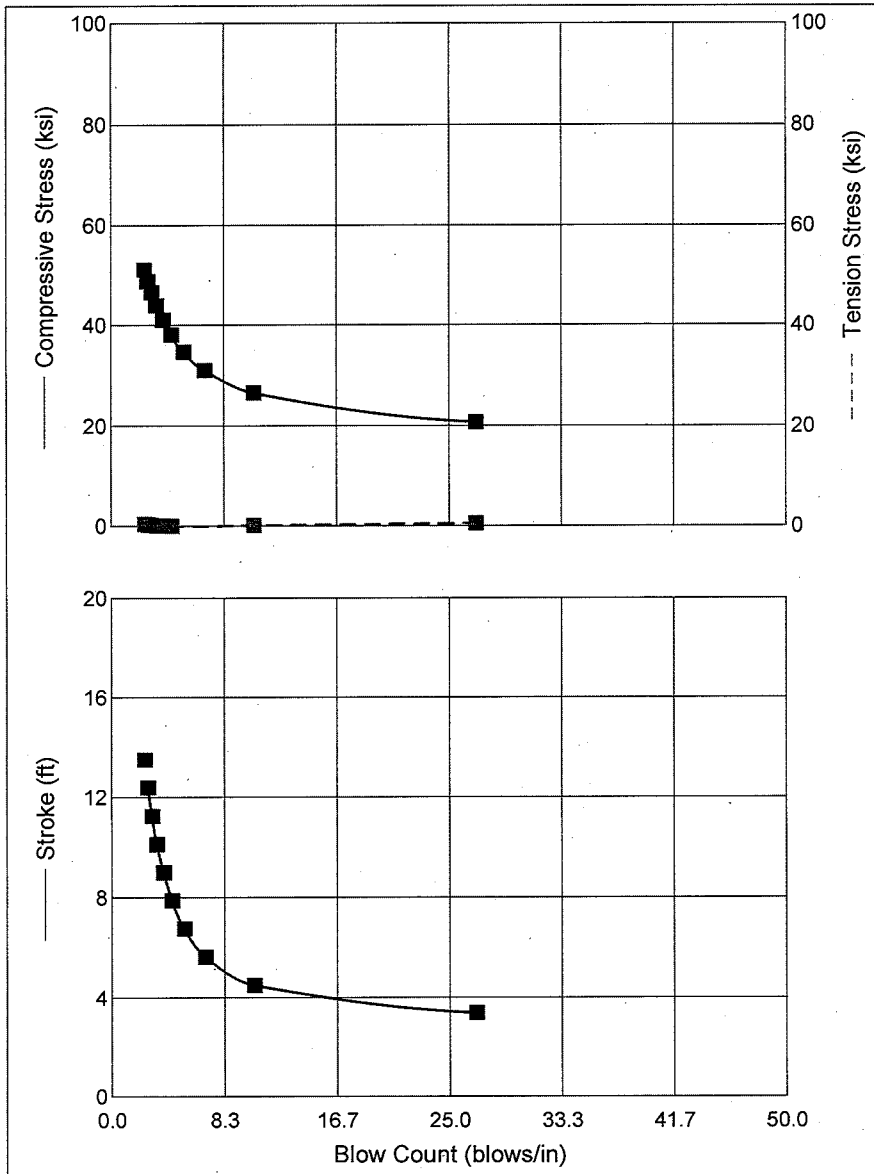
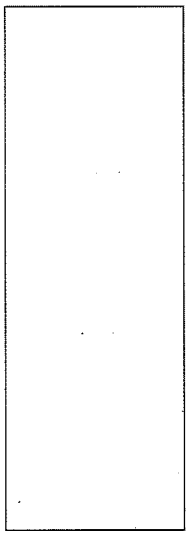
MKT DE42- Variable Stroke



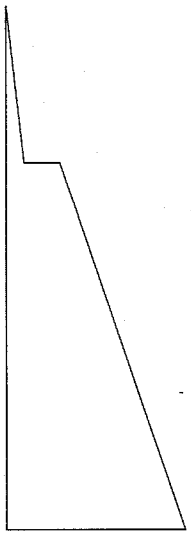
MKT DE 42/35

Capacity	310.0	kips
Efficiency	0.700	
Helmet	1.20	kips
Hammer Cushion	40399	kips/in
Skin Quake	0.100	in
Toe Quake	0.040	in
Skin Damping	0.050	sec/ft
Toe Damping	0.150	sec/ft
Pile Length	20.00	ft
Pile Penetration	20.00	ft
Pile Top Area	18.40	in2

Pile Model



Skin Friction Distribution



Res. Shaft = 14 %
(Proportional)

MKT DE42 Variable Stroke

H.B. FLEMING
Clarendon BRO 1443(48)

12-Feb-2016
GRLWEAP (TM) Version 2005

Ultimate Capacity kips	Maximum Compression Stress ksi	Maximum Tension Stress ksi	Blow Count blows/in	Stroke ft	Energy kips-ft
310.0	20.72	0.57	27.0	3.38	3.40
310.0	26.53	0.16	10.5	4.50	5.95
310.0	30.97	0.00	6.9	5.62	8.54
310.0	34.63	0.00	5.4	6.75	11.06
310.0	38.05	0.02	4.5	7.88	13.61
310.0	40.98	0.08	3.9	9.00	16.11
310.0	43.83	0.14	3.4	10.12	18.60
310.0	46.50	0.23	3.0	11.25	21.14
310.0	48.71	0.32	2.7	12.38	23.95
310.0	51.07	0.40	2.5	13.50	26.73

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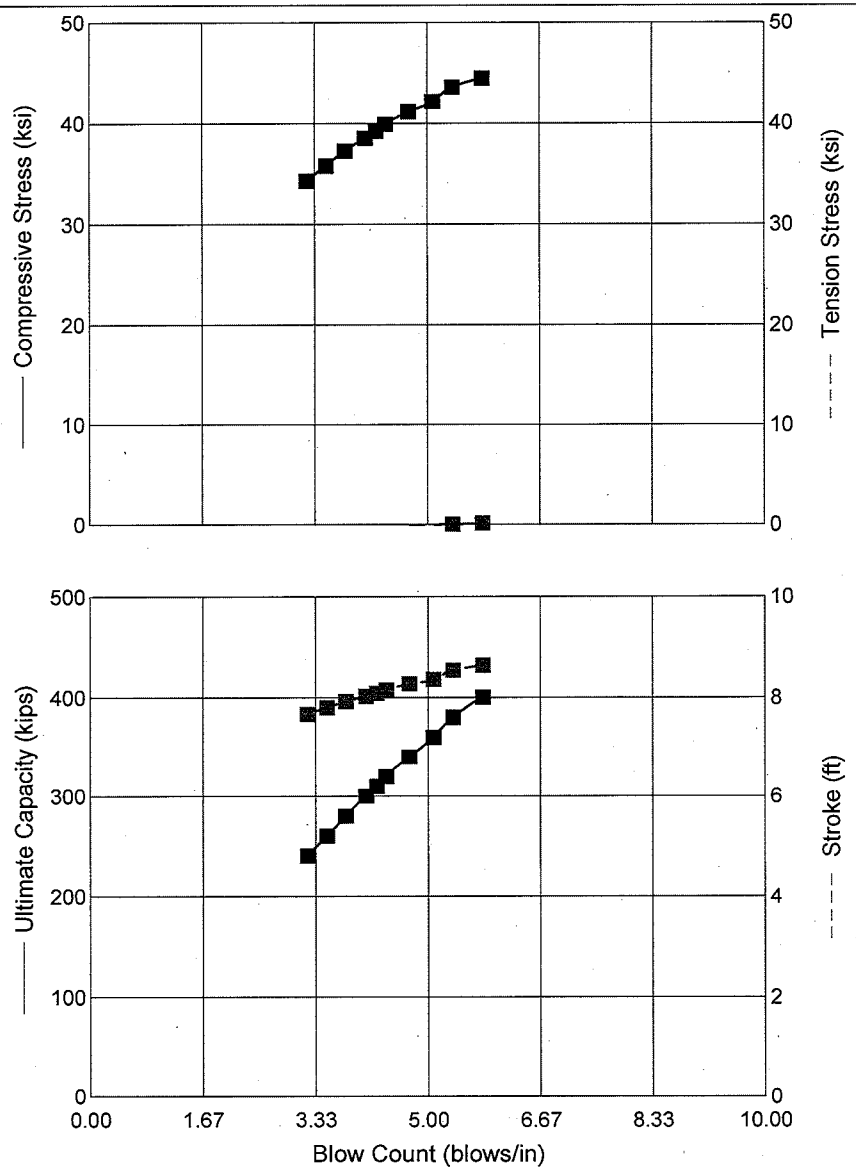
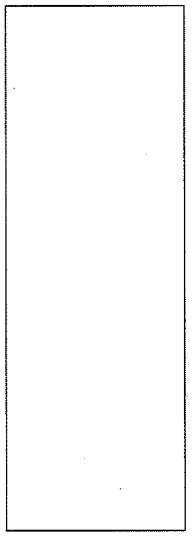


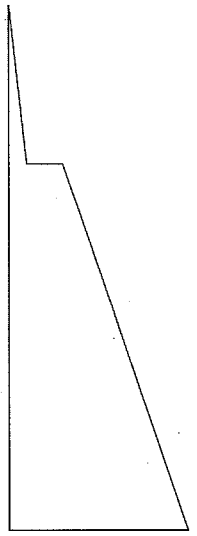
APE D 19-42

Efficiency	0.700	
Helmet	1.20	kips
Hammer Cushion	40399	kips/in
Skin Quake	0.100	in
Toe Quake	0.040	in
Skin Damping	0.050	sec/ft
Toe Damping	0.150	sec/ft
Pile Length	20.00	ft
Pile Penetration	20.00	ft
Pile Top Area	18.40	in2

Pile Model



Skin Friction Distribution



Res. Shaft = 14 %
(Proportional)

APE D19 Variable Capacity

APE D19 Variable Capacity

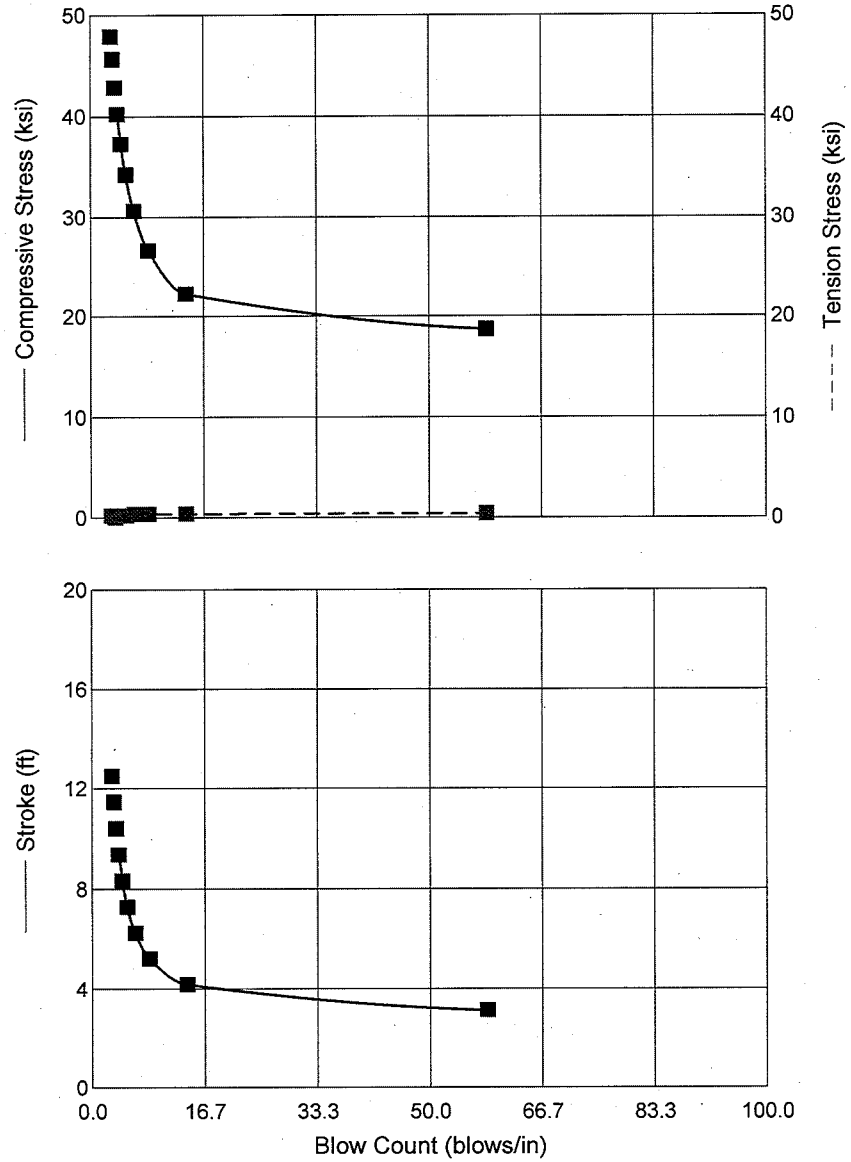
H.B. FLEMING
Clarendon BRO 1443(48)

12-Feb-2016
GRLWEAP (TM) Version 2005

Ultimate Capacity kips	Maximum Compression Stress ksi	Maximum Tension Stress ksi	Blow Count blows/in	Stroke ft	Energy kips-ft
240.0	34.28	0.00	3.2	7.67	14.35
260.0	35.76	0.00	3.5	7.80	14.33
280.0	37.22	0.00	3.8	7.92	14.36
300.0	38.48	0.00	4.1	8.02	14.35
310.0	39.20	0.00	4.2	8.08	14.34
320.0	39.88	0.00	4.4	8.15	14.41
340.0	41.12	0.00	4.7	8.27	14.40
360.0	42.13	0.00	5.1	8.36	14.40
380.0	43.57	0.06	5.4	8.54	14.65
400.0	44.45	0.14	5.8	8.64	14.60

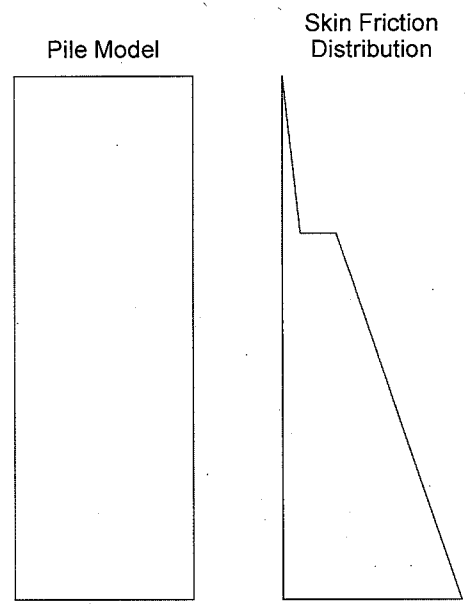
H.B. FLEMING
Clarendon BRO 1443(48)

12-Feb-2016
GRLWEAP (TM) Version 2005



APE D 19-42

Capacity	310.0	kips
Efficiency	0.700	
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	0.150	sec/ft
Pile Length	20.00	ft
Pile Penetration	20.00	ft
Pile Top Area	18.40	in2



Res. Shaft = 14 %
(Proportional)

APE D19 Variable Stroke

APE D19 Variable Stroke

H.B. FLEMING
Clarendon BRO 1443(48)

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Ultimate Capacity kips	Maximum Compression Stress ksi	Maximum Tension Stress ksi	Blow Count blows/in	Stroke ft	Energy kips-ft
310.0	18.68	0.43	58.5	3.12	3.63
310.0	22.22	0.40	14.0	4.17	5.94
310.0	26.61	0.37	8.5	5.21	8.31
310.0	30.63	0.37	6.4	6.25	10.59
310.0	34.23	0.24	5.2	7.29	12.94
310.0	37.30	0.00	4.5	8.33	15.16
310.0	40.23	0.00	3.9	9.38	17.53
310.0	42.91	0.05	3.6	10.42	19.72
310.0	45.69	0.25	3.3	11.46	21.97
310.0	47.94	0.24	3.0	12.50	24.21