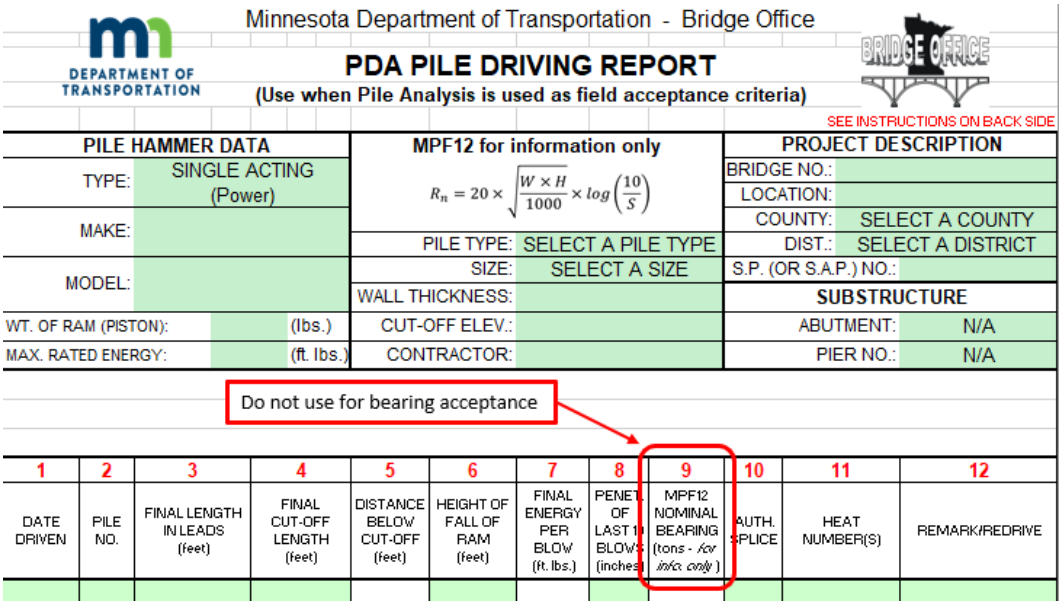
MnDOT Bridge – PDA Pile Driving Report Guide

This guide document provides instructions and examples for proper usage of the "PDA Pile Driving Report" form. This form should be used whenever PDA or Pile Analysis is used as the acceptance criteria for required nominal pile bearing resistance.

SHEET 1 – PILE DRIVING REPORT

The inspector will fill out all information required. Note that Nominal Bearing on this sheet is calculated using the MPF12 formula. This value cannot be used as acceptance when PDA is used; the data is shown for information only.



Minnesota Department of Transportation - Bridge Office

DEPARTMENT OF TRANSPORTATION

PDA PILE DRIVING REPORT

(Use when Pile Analysis is used as field acceptance criteria)

BRIDGE OFFICE

SEE INSTRUCTIONS ON BACK SIDE

PILE HAMMER DATA		MPF12 for information only	PROJECT DESCRIPTION	
TYPE:	SINGLE ACTING (Power)	$R_n = 20 \times \sqrt{\frac{W \times H}{1000}} \times log\left(\frac{10}{S}\right)$	BRIDGE NO.:	
MAKE:			LOCATION:	
			COUNTY:	SELECT A COUNTY
		PILE TYPE: SELECT A PILE TYPE	DIST.:	SELECT A DISTRICT
MODEL:		SIZE: SELECT A SIZE	S.P. (OR S.A.P.) NO.:	
		WALL THICKNESS:	SUBSTRUCTURE	
WT. OF RAM (PISTON):	(lbs.)	CUT-OFF ELEV.:	ABUTMENT:	N/A
MAX. RATED ENERGY:	(ft. lbs.)	CONTRACTOR:	PIER NO.:	N/A

Do not use for bearing acceptance

1	2	3	4	5	6	7	8	9	10	11	12
DATE DRIVEN	PILE NO.	FINAL LENGTH IN LEADS (feet)	FINAL CUT-OFF LENGTH (feet)	DISTANCE BELOW CUT-OFF (feet)	HEIGHT OF FALL OF RAM (feet)	FINAL ENERGY PER BLOW (ft. lbs.)	PENET. OF LAST 10 BLOWS (inches)	MPF12 NOMINAL BEARING (tons - for info only)	AUTH. SPLICE	HEAT NUMBER(S)	REMARK/REDRIVE

For submitting the final report, the accepted PDA results report provided by the Contractor must be attached to this record.

SHEET 2 – ADDITIONAL DATA

The inspector will include a sketch of the pile layout on this sheet. The PDA data (table and graph) on this sheet is populated based on entries from other sheets. This sheet is important for final documentation of pile acceptance and provides a visual check to ensure all piles satisfy the requirements of the PDA Inspectors' Chart.

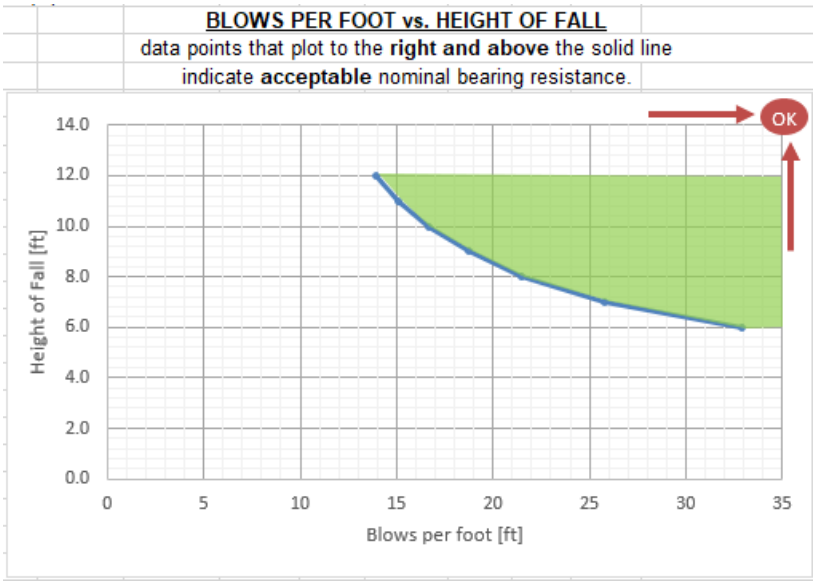
SHEET 3 – JOB AID

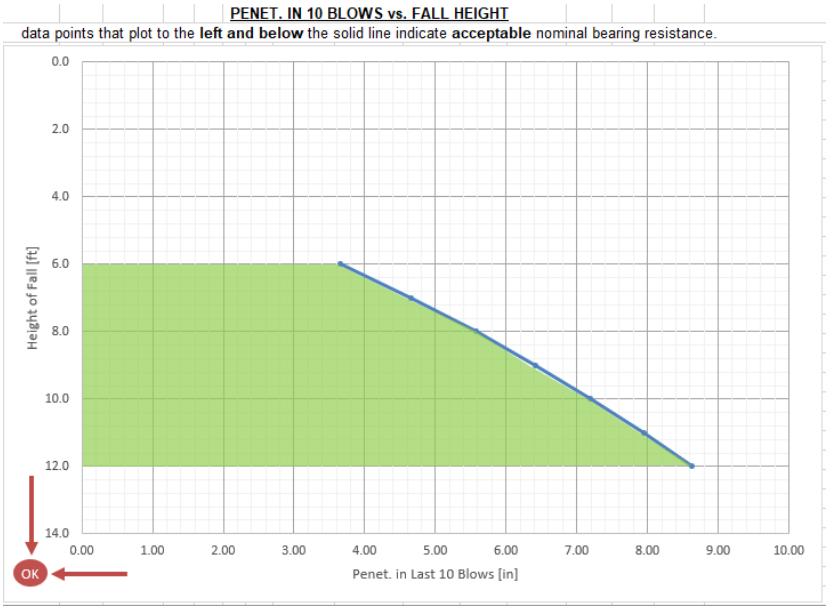
The inspector will use the accepted PDA Inspectors' Chart to enter inspection criteria. Enter the HEIGHT OF FALL (in feet) and one of the following:

- BLOWS PER FOOT (count)
- PENETRATION OF LAST 10 BLOWS (in)

The graphs will generate based on the data entered. This sheet can be printed and used in the field for a visual check on acceptance during driving.

With each graph, there is a maroon "OK CIRCLE" with maroon arrows to describe which side of the bearing line the pile driving data needs to plot on. To further explain this, pile data that plots within the shaded green area is consider meeting or exceeding the nominal bearing resistance criteria:





Example 1

This example uses a PDA Inspector Chart where BLOWS PER FOOT has been provided:

Inspector's Chart – GRLWEAP Version 2010
(Nominal Pile Bearing plots above and right of curve)
Bridge 69910, I-35 SB off ramp to US 53 NB over Fill, St Louis County, Duluth, MN
Pier 2, TP-3, D46-32 Hammer, 55' long, 16" OD, 3/8" CIP
Nominal Pile Bearing 308.3 tons (616.6 kips) PDA method of field control

Ultimate Capacity kips	Maximum Compression Stress ksi	Maximum Tension Stress ksi	Blow Count blows/ft	Stroke ft	Energy kips-ft
616.6	30.41	3.79	9999.0	3.00	15.65
616.6	40.08	4.25	99.6	4.00	26.60
616.6	44.13	4.12	48.3	5.00	35.96
616.6	47.35	4.07	32.9	6.00	44.98
616.6	49.93	4.02	25.8	7.00	53.41
616.6	52.18	3.99	21.5	8.00	61.79
616.6	54.11	3.95	18.7	9.00	69.75
616.6	55.85	3.92	16.7	10.00	77.50
616.6	57.49	3.90	15.1	11.00	85.53
616.6	58.92	3.87	13.9	12.00	93.01

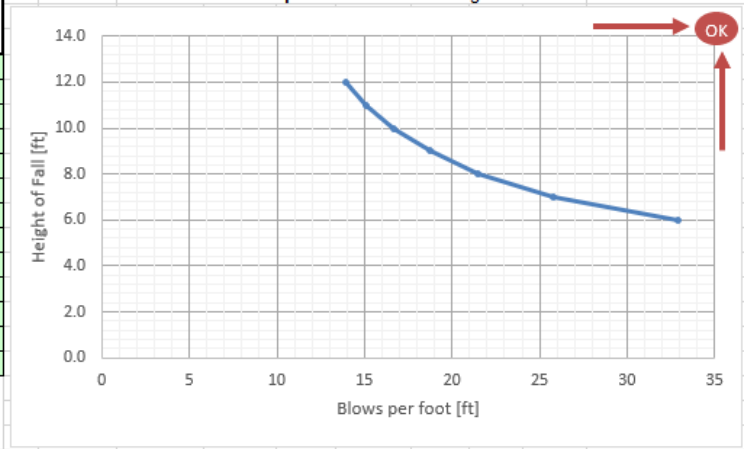
Enter the data in the BLUE rectangles on Sheet 3:

JOB AID:
INSPECTORS' CHART

Notes:
The information from this sheet is to be used for field-inspection aid. It does not need to be included with final submittal.
All PDA data is input on this sheet and displayed on sheet ADDITIONAL DATA: PILE DRIVING REPORT (Page 2).
To adjust the scale of the graphs, adjust the HEIGHT OF FALL to be a smaller range.
Enter HEIGTH OF FALL and one of the following (not both) as presented in the PDA Inspectors' Chart provided:
BLOWS PER FOOT (count)
PENET. OF LAST 10 BLOWS (in)

BLOWS PER FOOT vs. HEIGHT OF FALL
data points that plot to the **right and above** the solid line
indicate **acceptable** nominal bearing resistance.

HEIGHT OF FALL (feet)	BLOWS PER FOOT (count)	PENET. OF LAST 10 BLOWS (in)
6.0	32.9	
7.0	25.8	
8.0	21.5	
9.0	18.7	
10.0	16.7	
11.0	15.1	
12.0	13.9	



Example 2

This example uses a PDA Inspector Chart where PENETRATION IN 10 BLOWS has been provided:

Inspector's Chart – GRLWEAP Version 2010
(Nominal Pile Bearing plots below and left of curve)
Bridge 69910, I-35 SB off ramp to US 53 NB over Fill, St Louis County, Duluth, MN
Pier 2, TP-3, D46-32 Hammer, 55' long, 16" OD, 3/8" CIP
Nominal Pile Bearing 308.3 tons (616.6 kips) PDA method of field control

Ultimate Capacity kips	Maximum Compression Stress ksi	Maximum Tension Stress ksi	Set in/10 bl	Stroke ft	Energy kips-ft
616.6	30.41	3.79	0.012	3.00	15.65
616.6	40.08	4.25	1.205	4.00	26.60
616.6	44.13	4.12	2.484	5.00	35.96
616.6	47.35	4.07	3.647	6.00	44.98
616.6	49.93	4.02	4.651	7.00	53.41
616.6	52.18	3.99	5.581	8.00	61.79
616.6	54.11	3.95	6.417	9.00	69.75
616.6	55.85	3.92	7.186	10.00	77.50
616.6	57.49	3.90	7.947	11.00	85.53
616.6	58.92	3.87	8.633	12.00	93.01

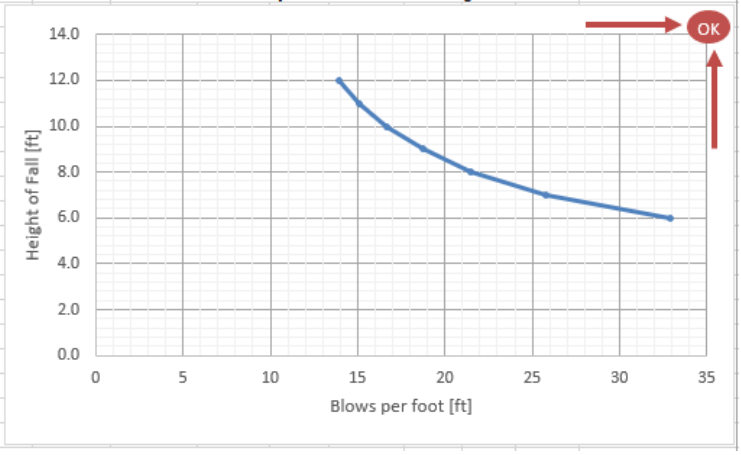
Enter the data in the BLUE rectangles on Sheet 3:

JOB AID:
INSPECTORS' CHART

Notes:
The information from this sheet is to be used for field-inspection aid. It does not need to be included with final submittal.
All PDA data is input on this sheet and displayed on sheet ADDITIONAL DATA: PILE DRIVING REPORT (Page 2).
To adjust the scale of the graphs, adjust the HEIGHT OF FALL to be a smaller range.
Enter HEIGTH OF FALL and one of the following (not both) as presented in the PDA Inspectors' Chart provided:
BLOWS PER FOOT (count)
PENET. OF LAST 10 BLOWS (in)

HEIGHT OF FALL (feet)	BLOWS PER FOOT (count)	PENET. OF LAST 10 BLOWS (in)
6.0		3.647
7.0		4.651
8.0		5.581
9.0		6.417
10.0		7.186
11.0		7.947
12.0		8.633

BLOWS PER FOOT vs. HEIGHT OF FALL
data points that plot to the **right and above** the solid line
indicate **acceptable** nominal bearing resistance.



Example 3

With both PDA Inspectors' Chart data and Pile Driving data enter, Sheet 2 will display the results:

ADDITIONAL DATA:
PILE DRIVING REPORT

General:

Fill in all shaded fields. The sheet has formulas that will automatically fill-in calculated areas.
Field measurements to be to the nearest 0.1 ft.
See Form "MPF12 Pile Driving Report" for instructions for entering data on first sheet.

PDA as field control

Input inspectors' chart data from PDA report into the table on sheet **JOB AID: INSPECTORS' Chart (Page 3)**.
Pile driving data points that plot to the **left and below** the solid line indicate **acceptable** nominal bearing resistance.

HEIGHT OF FALL (feet)	BLOWS PER FOOT (count)	PENET. OF LAST 10 BLOWS (in)
6.0	32.9	3.647
7.0	25.8	4.651
8.0	21.5	5.581
9.0	18.7	6.417
10.0	16.7	7.186
11.0	15.1	7.947
12.0	13.9	8.633