BELOW-THE-HOOK LIFTING DEVICE
Engineering Note Cover Page

Lifting Device Numbers:

FNAL Site No.:_____ if applicable Div. Specific No.: 156 if applicable Asset No. _____ if applicable

ASME B30.20 Group: (check one)
- ˇ Group I Structural and Mechanical Lifting Devices
- ˇ Group II Vacuum Lifting Devices
- ˇ Group III Magnets, Close Proximity Operated
- ˇ Group IV Magnets, Remote Operated

Device Name or Description: 5.1 TON FORK LIFT CONCRETE BLOCK LIFT HOOK

Device was: (check all applicable)
- ˇ Purchased from a Commercial Lifting Device Manufacturer
  mfg. name: _____
- ˇ Designed and Built at Fermilab
- ˇ Designed by Fermilab and Built by a Vendor
  Assy drawing number: _____
- ˇ Provided by a User or Other Laboratory
- ˇ Other. Describe:_____

Engineering Note Prepared by: ERNIE VILLEGAS Date : 8/31/01

Engineering Note Reviewed by: _____ Date: _____

Lifting Device Data:

Capacity: 10,200#

Fixture Weight: 53#

Service: ˇ normal (heavy) ˇ severe (refer to B30.20 for definitions)

Duty Cycle: _____8, 16 or 24 hour rating (applicable to groups III, and IV)

Inspections Frequency: _____

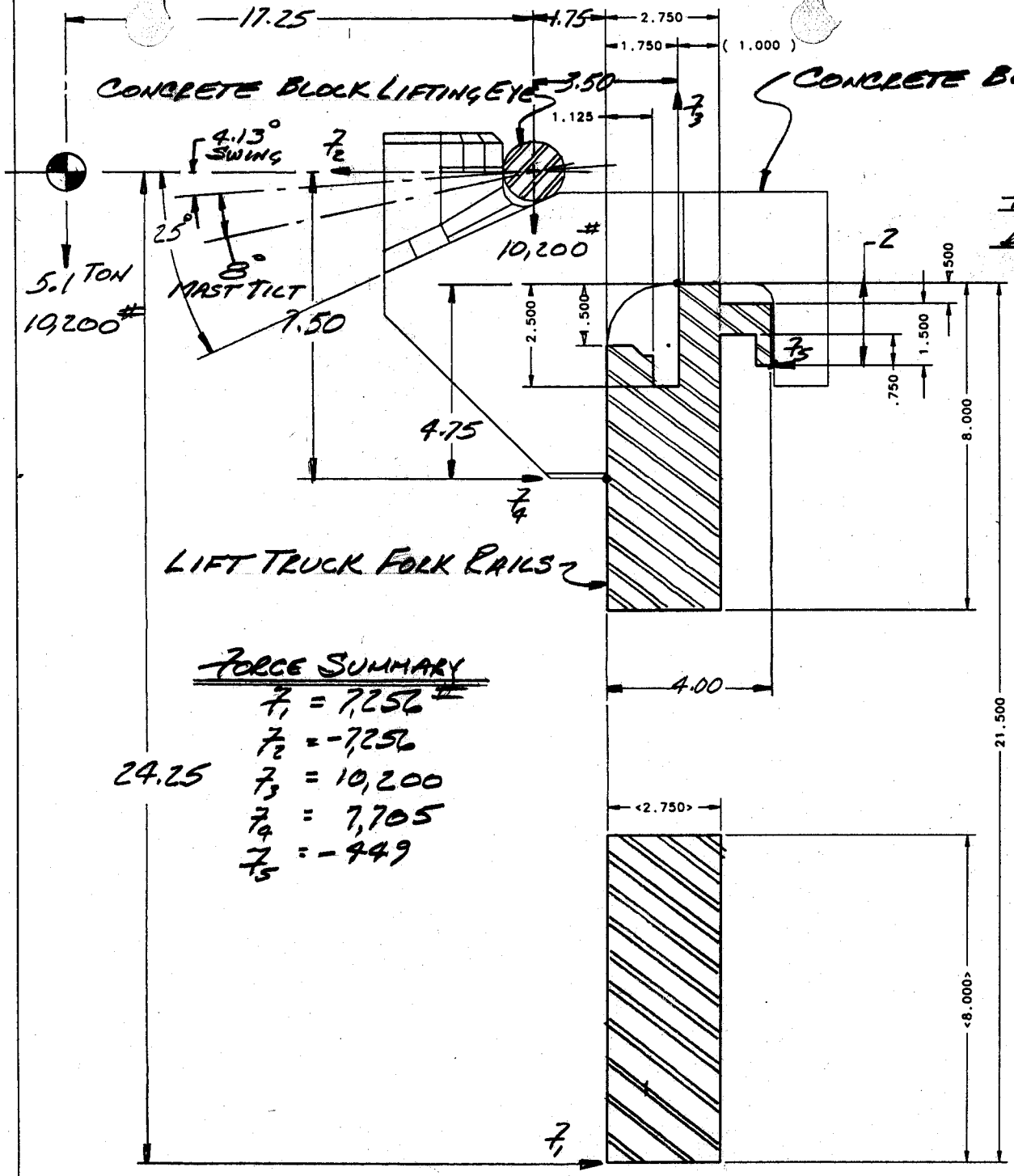
Rated Load Test by FNAL (if applicable): Date :_____ Load: 12,750 (125%)

ˇ Check if Load Test was by Vendor and attach the certificate.

Satisfactory Load Test Witnessed by: _____

Signature (of Load Test Witness):_____

Notes or Special Information:



FORCE SUMMARY

$F_1 = 7{,}256^{\#}$

$F_2 = -7{,}256$

$F_3 = 10{,}200$

$F_4 = 7{,}705$

$F_5 = -449$

FORCES DUE TO CONCRETE BLOCK SWINGING ON HOOK

$\Sigma M_{@EYE} = 17.25 \times (-10{,}200) + 24.25 F_1 = 0$

$F_1 = 7256^{\#}$

$\Sigma F_x = F_1 + F_2 = 0$

$F_2 = -7256^{\#}$

FORCES ON HOOK

$\Sigma F_y = -10{,}200 + F_3 = 0$

$F_3 = 10{,}200^{\#}$

$\Sigma M_{@F_3} = 3.50 \times (-10{,}200) + 4.75 F_4 + 2 F_5 = 0$

ALSO $\Sigma F_x = F_2 + F_4 + F_5 = 0$

$F_5 = -(-7256) - F_4$

$= -35{,}700 + 4.75 F_4 + 2(7256 - F_4) = 0$

$= -35{,}700 + 4.75 F_4 - 2 F_4 + 14{,}512 = 0$

$= 2.75 F_4 - 21188 = 0$

$F_4 = 7705^{\#}$

$F_5 = 7256 - F_4$

$= -449^{\#}$

Y
Z X

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/cadwhw/home01/ms_villeg concrete_lftg_block.mf1

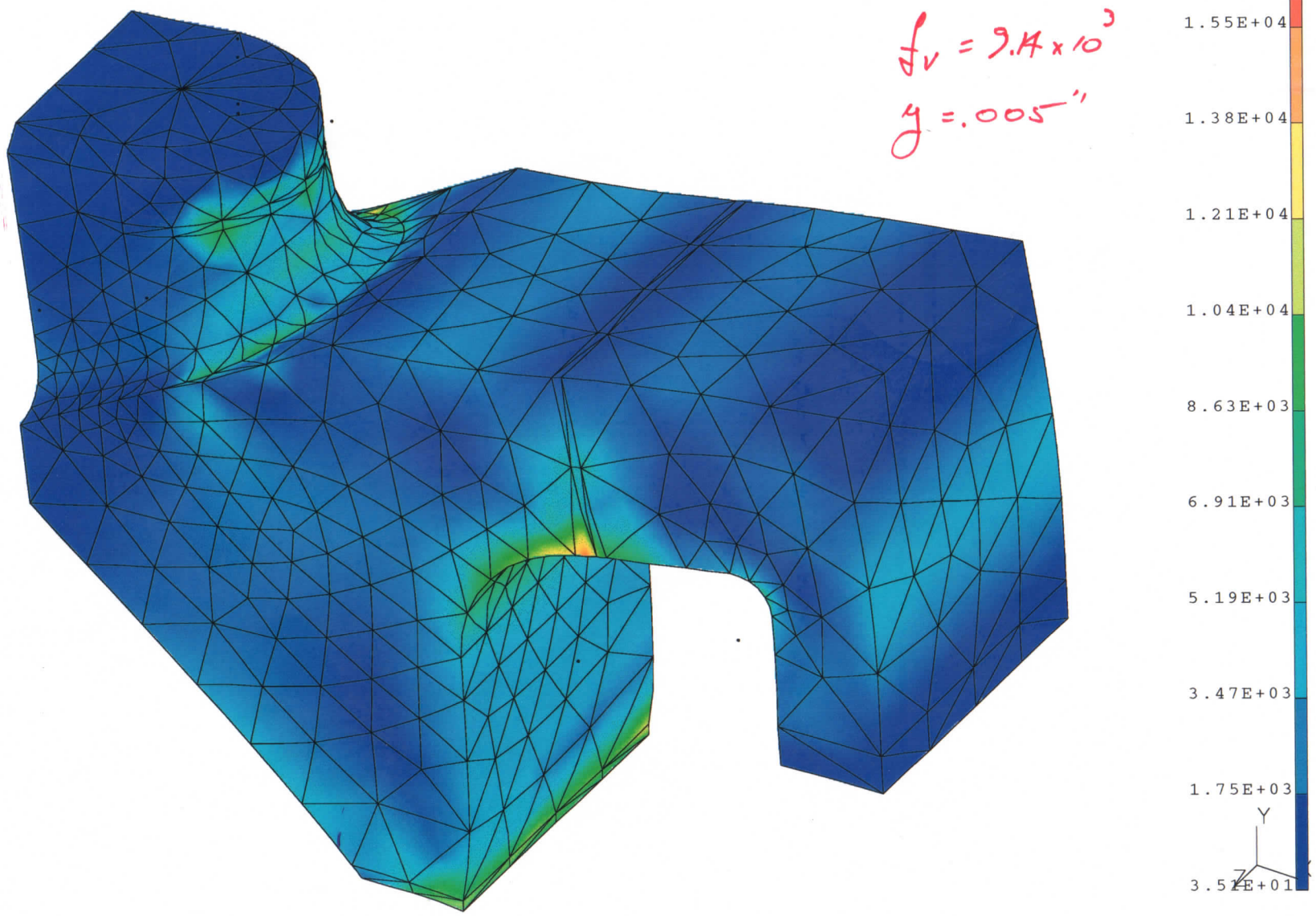
RESULTS: 2- B.C. 1,STRESS_2,LOAD SET 1
STRESS - VON MISES MIN: 3.51E+01 MAX: 1.72E+04
DEFORMATION: 1- B.C. 1,DISPLACEMENT_1,LOAD SET 1
DISPLACEMENT - MAG MIN: 2.03E-06 MAX: 4.74E-03
FRAME OF REF: PART

VALUE OPTION:ACTUAL

f_{VM} = 1.72E+04

$f_v = 9.14 \times 10^3$

$y = .005''$



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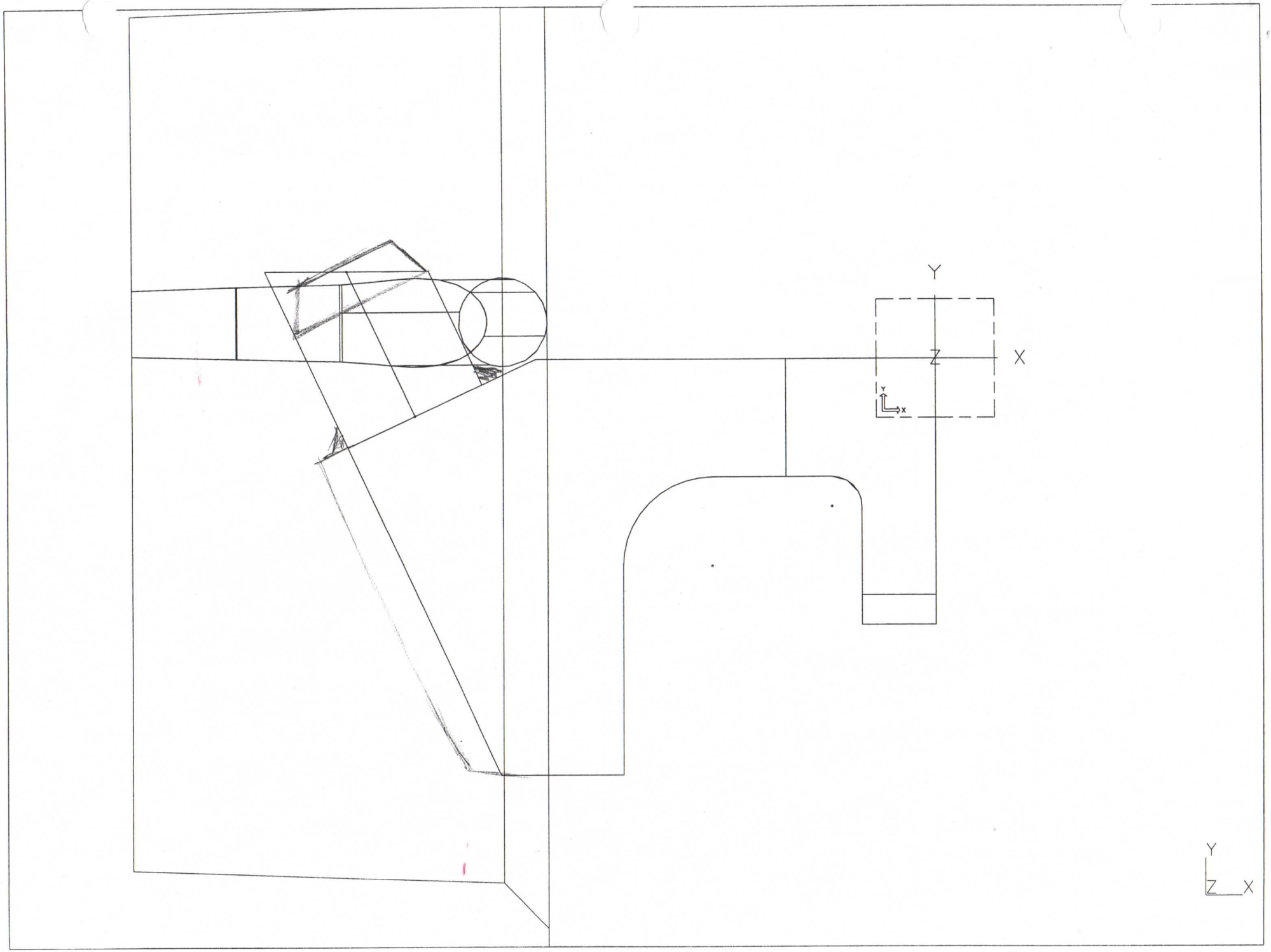

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