

HCAL for the TESLA detector

I. contribution to TDR

- 12 figures
- 6 pages text
- [afs/desy.de/user/k/korbel/
public/tdr.HCAL.version2.tex](afs/desy.de/user/k/korbel/public/tdr.HCAL.version2.tex)
- reference to ≈ 10 LC-Notes in preparation>>

II. present status of HCAL design

III. installation of HCAL

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IV. barrel wedge protoptype (ITEP/DESY), 2001

List of LC-Notes envisaged

- HCAL calorimeter modules, materials, structures and final engineering.
- The optical HCAL detection system: from scintillator tile and wavelength shifter fibre to readout fibre and light mixer.
- Photodetectors for the HCAL, performance comparison.
- The electrical readout chain for the HCAL, discussion of requirements and performance.
- Tile and cell pattern for the HCAL modules.
- Installation of the HCAL, ECAL.
- Containment of particles and jets in HCAL and correction for losses with the muon system.
- e/h compensation by weighting a la H1.
- A HCAL barrel wedge as prototype, construction and calorimeter performance tests.
- Calibration and monitoring of the HCAL.
-
-

Tile pattern in HCAL

6 different pattern, layer 0-5

constraints by:

- outer shape of ECAL
- minimum required tile size
- inner and outer radius of endcaps
- lateral fibre readout
- reasonable board sizes
- position of spacer bolts

tile sizes:

L0: 12 x 12

L1: 8.5 x 8.5

L2: 10.6 x 10.6

L3: 12.1 x 12.1

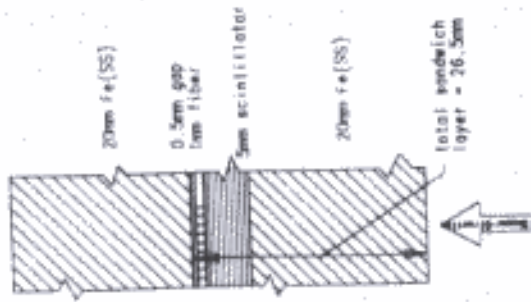
L4: 20.6 x 20.5

L5: 25 x 25 cm²

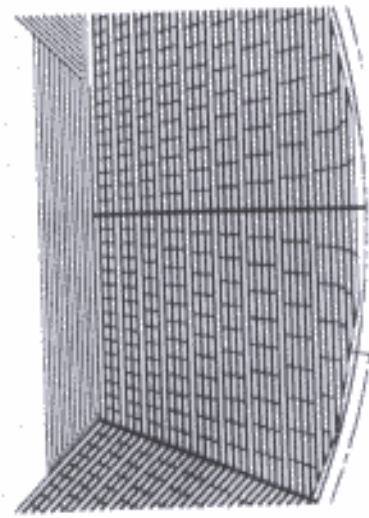
lateral cut through the TESLA inner detector

magnetic coil

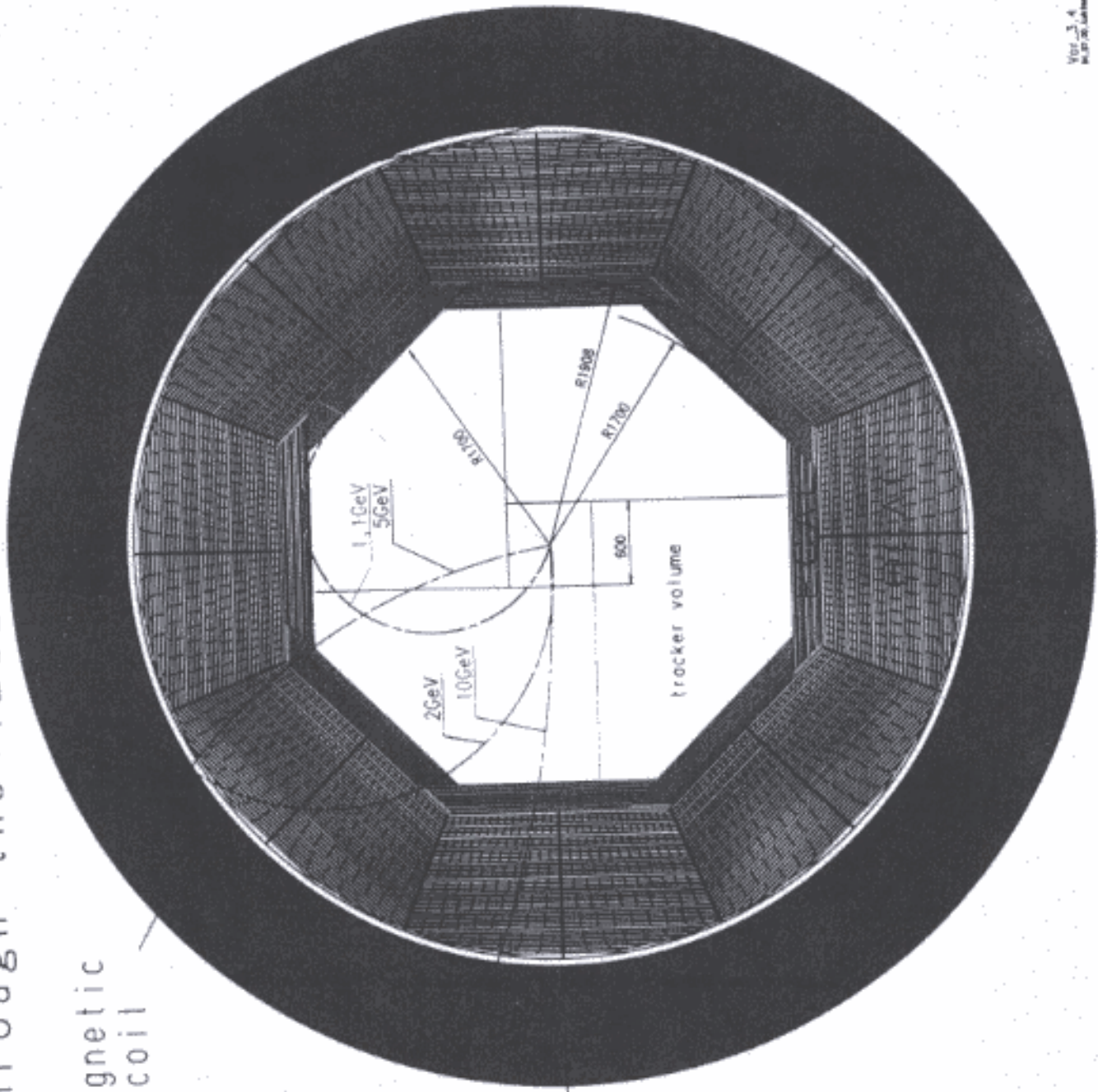
HCAL sampling layer structure



650



calorimeter structure



W 4a)

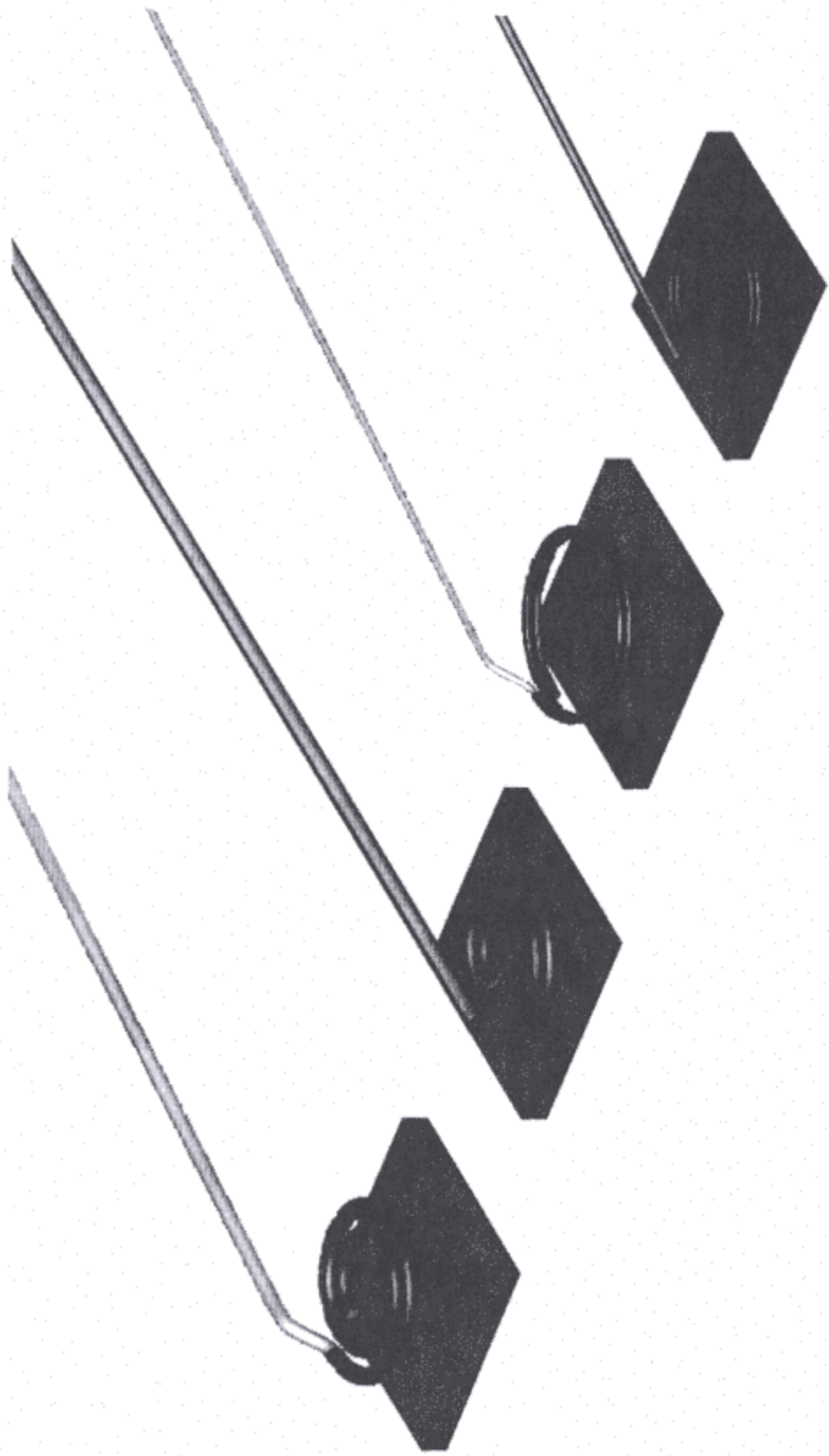
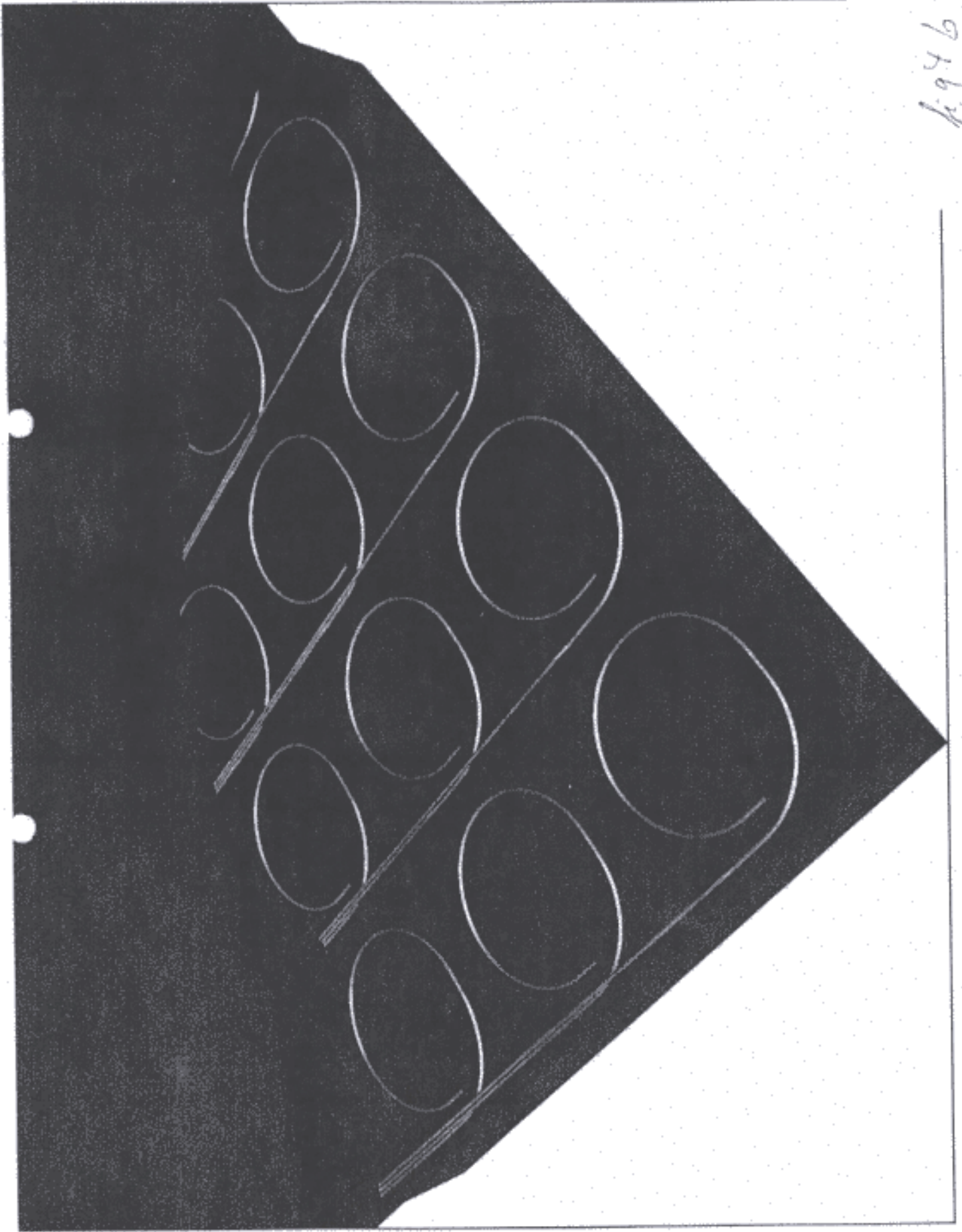
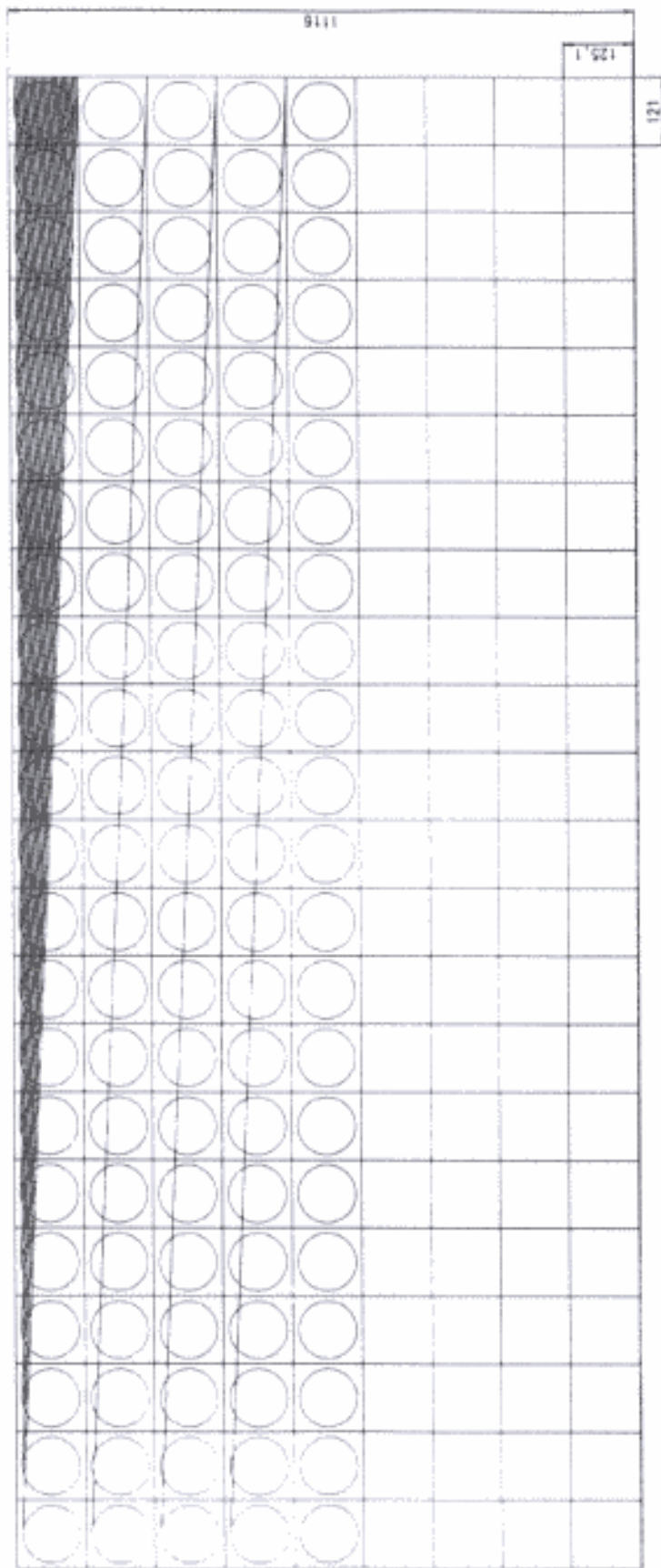


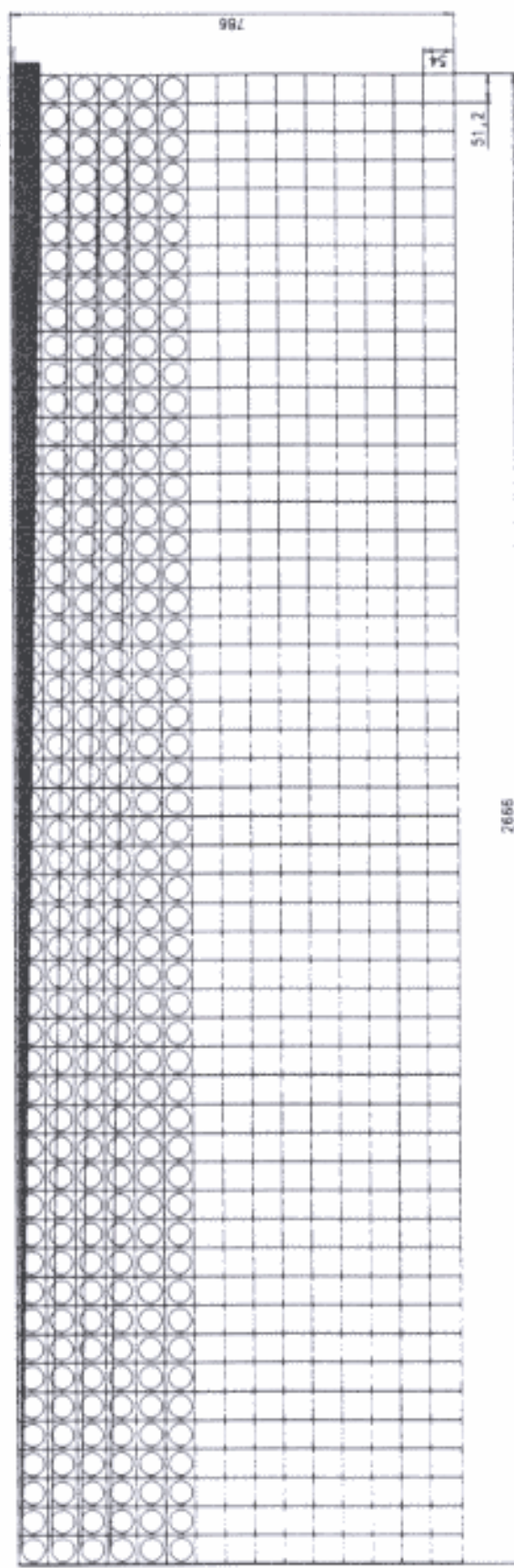
Fig 46



barrel calorimeter tile plate structures



8. layer



1. layer

HCAL, readout

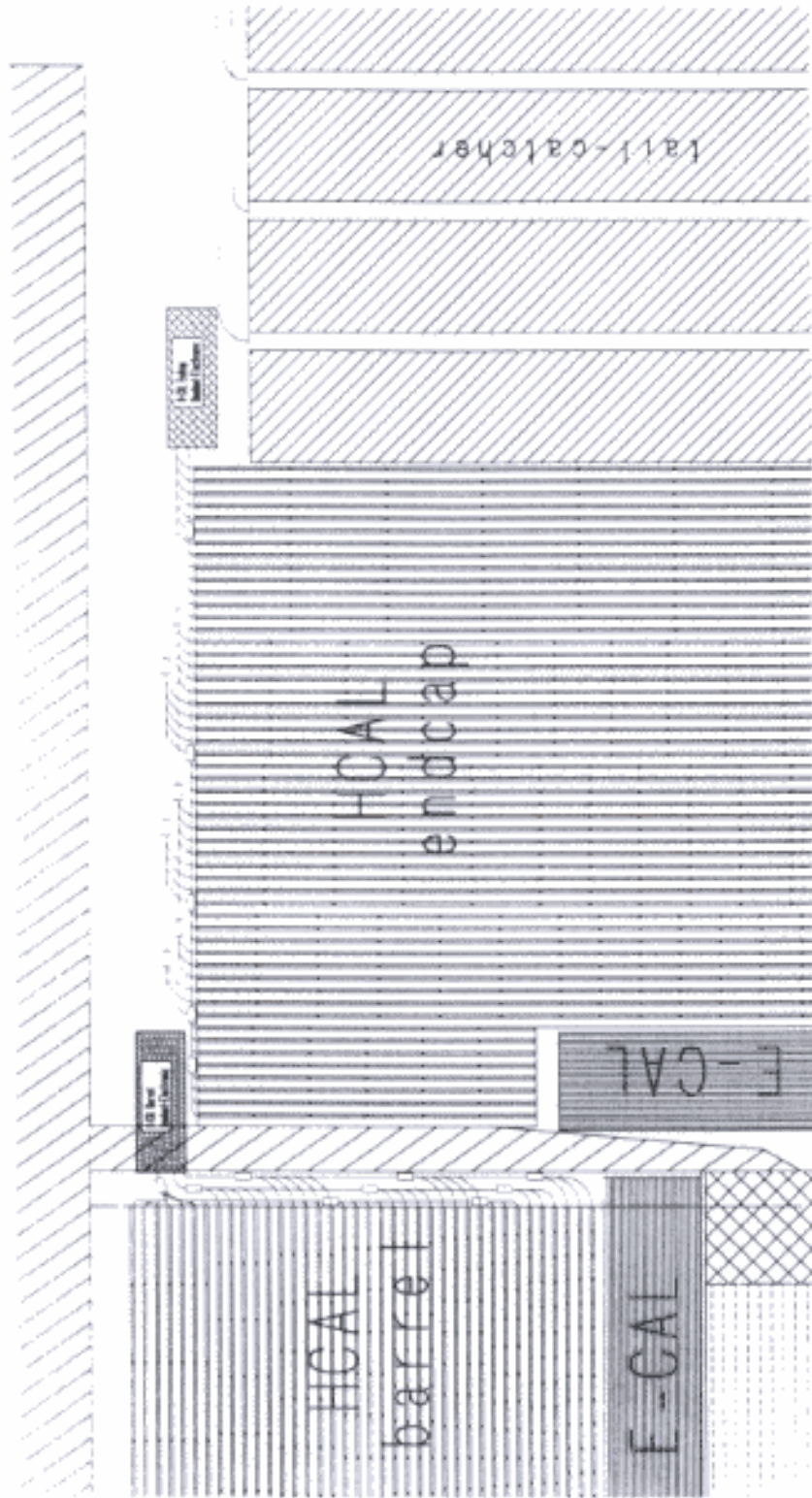


fig 8

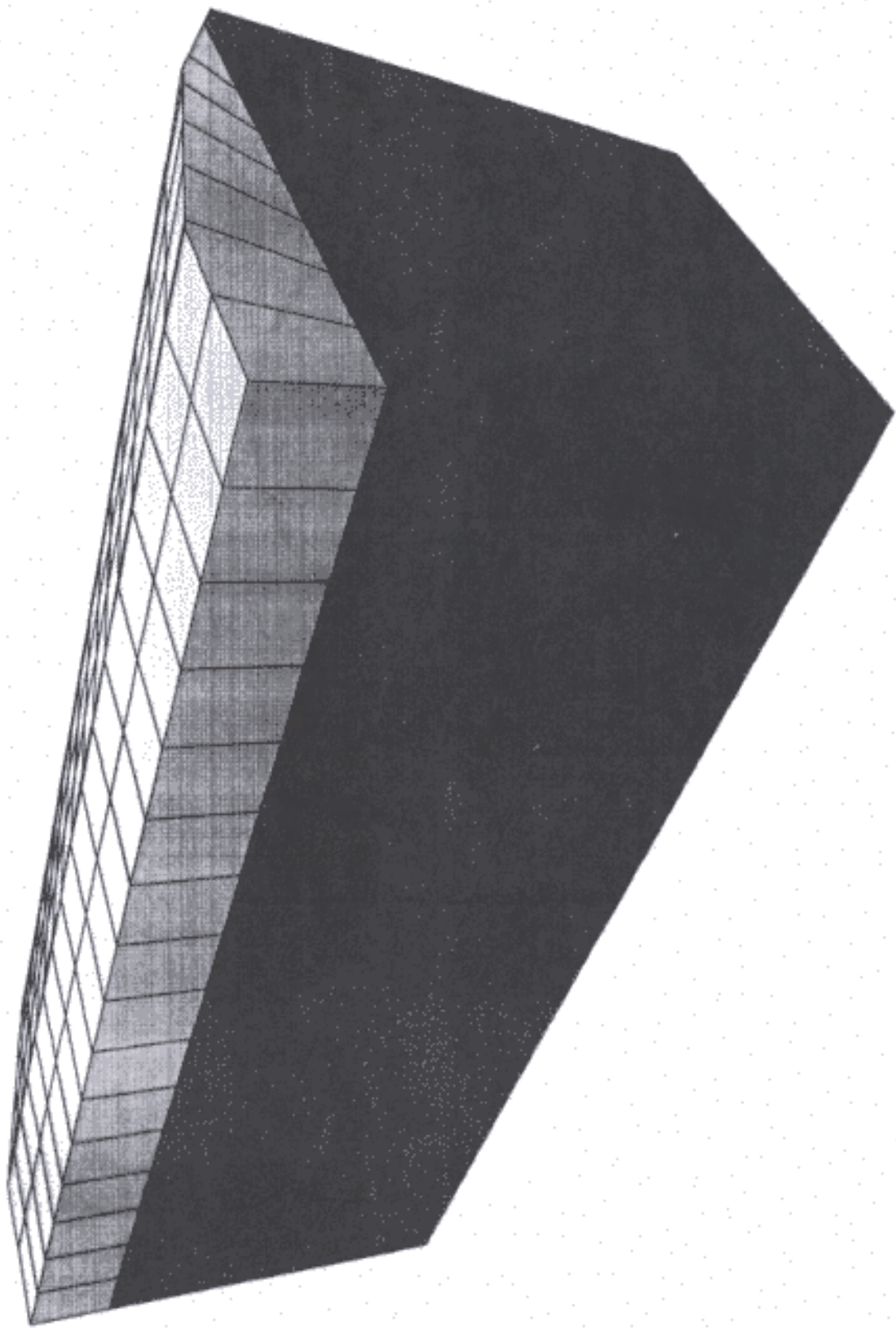


Fig 2

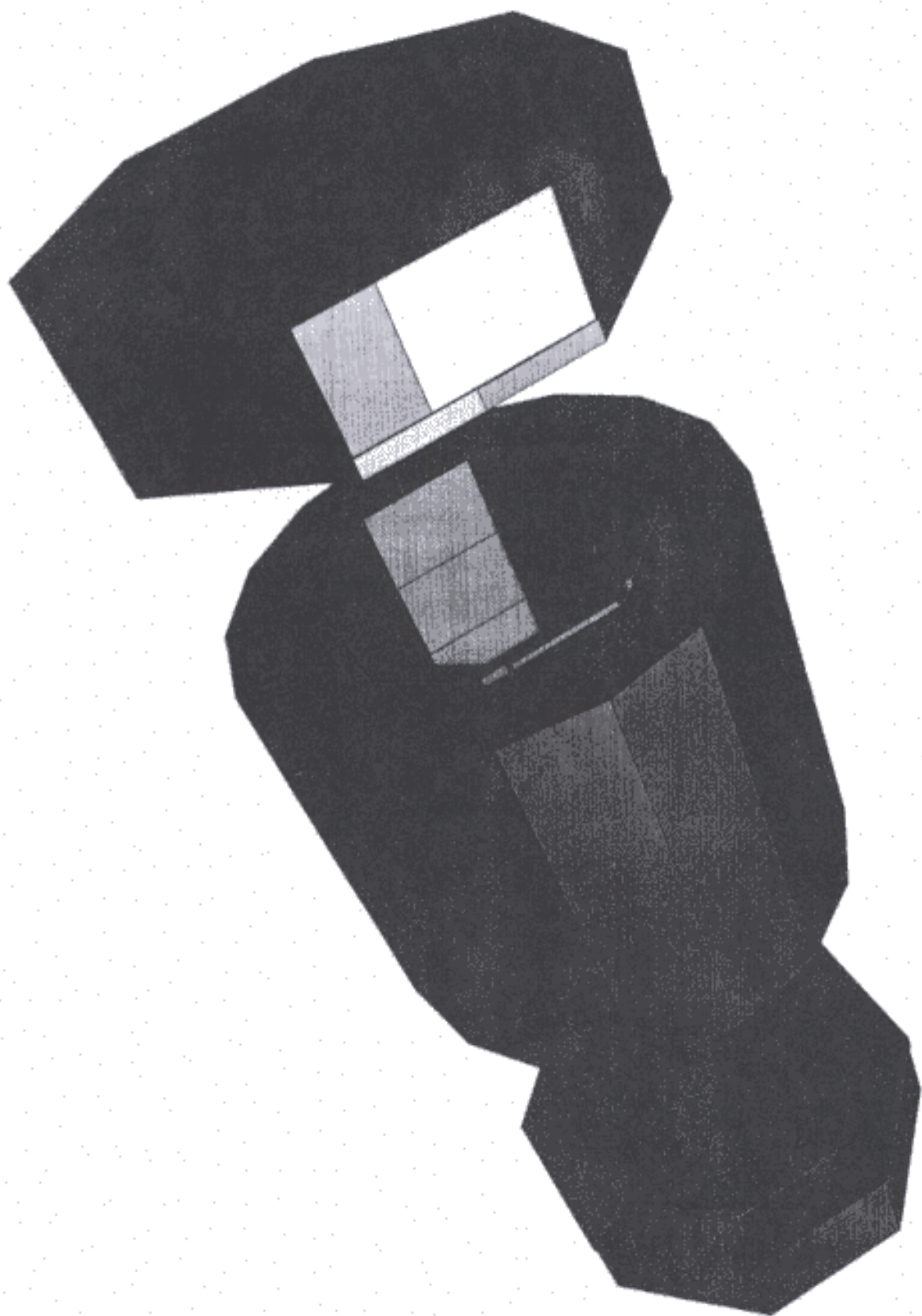
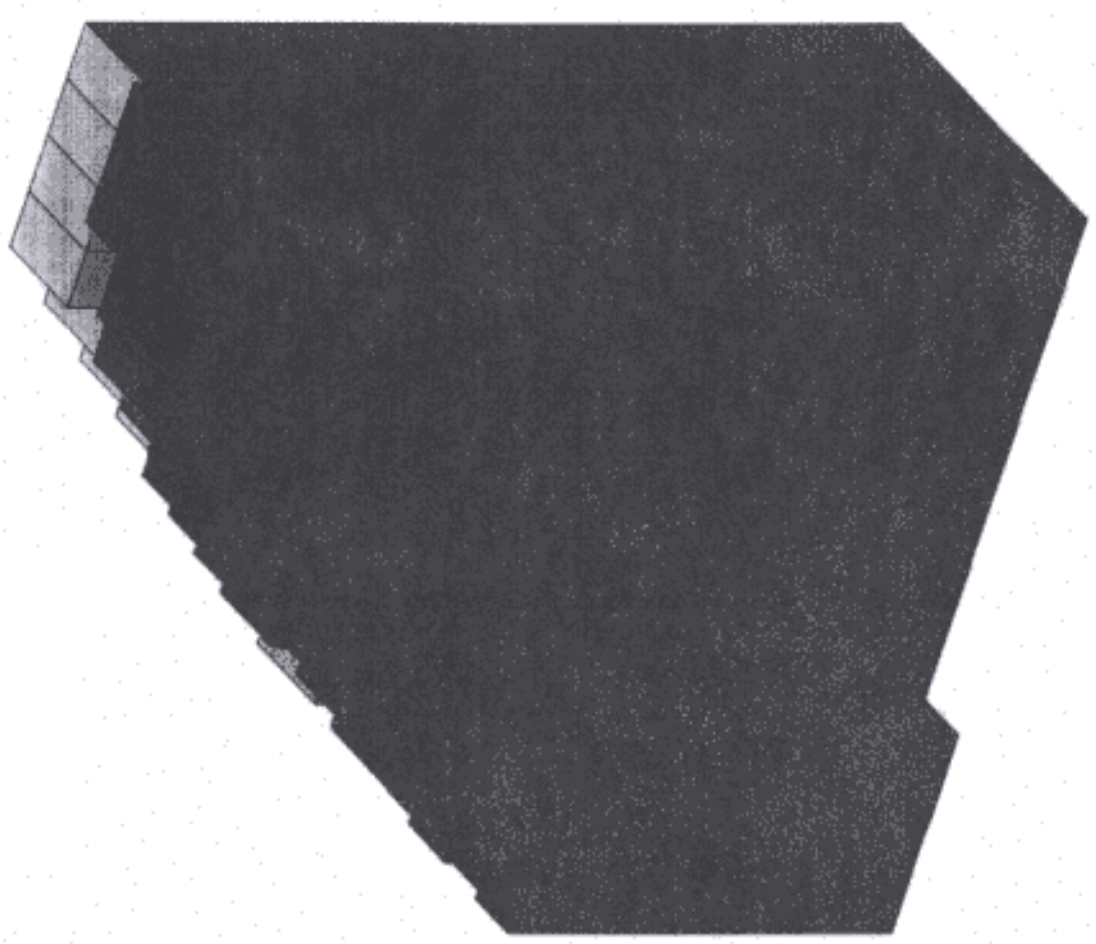


Fig. 3

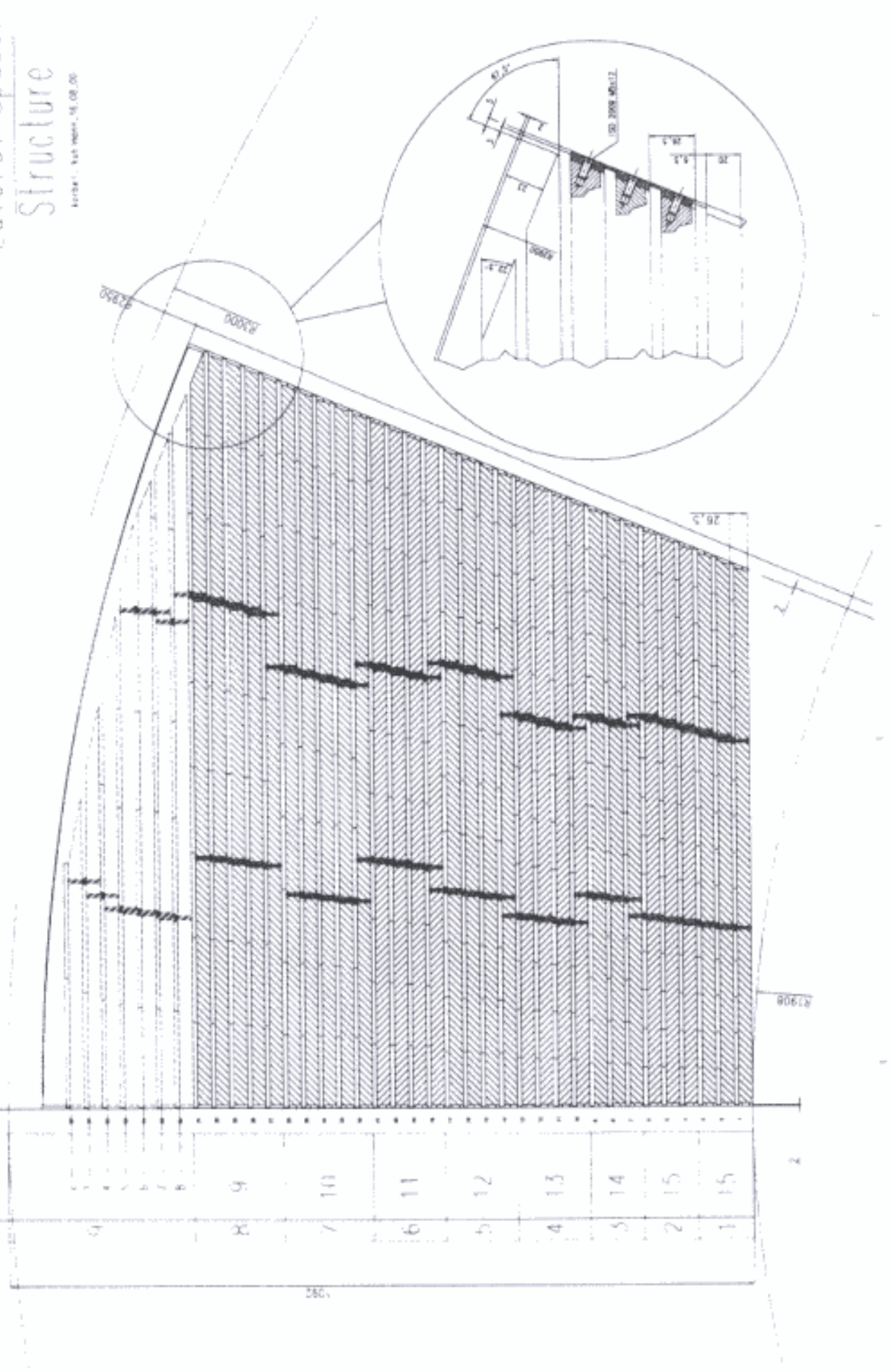


H-Cal Barrel Lateral Spacer Structure

REVISED: 08/08/00

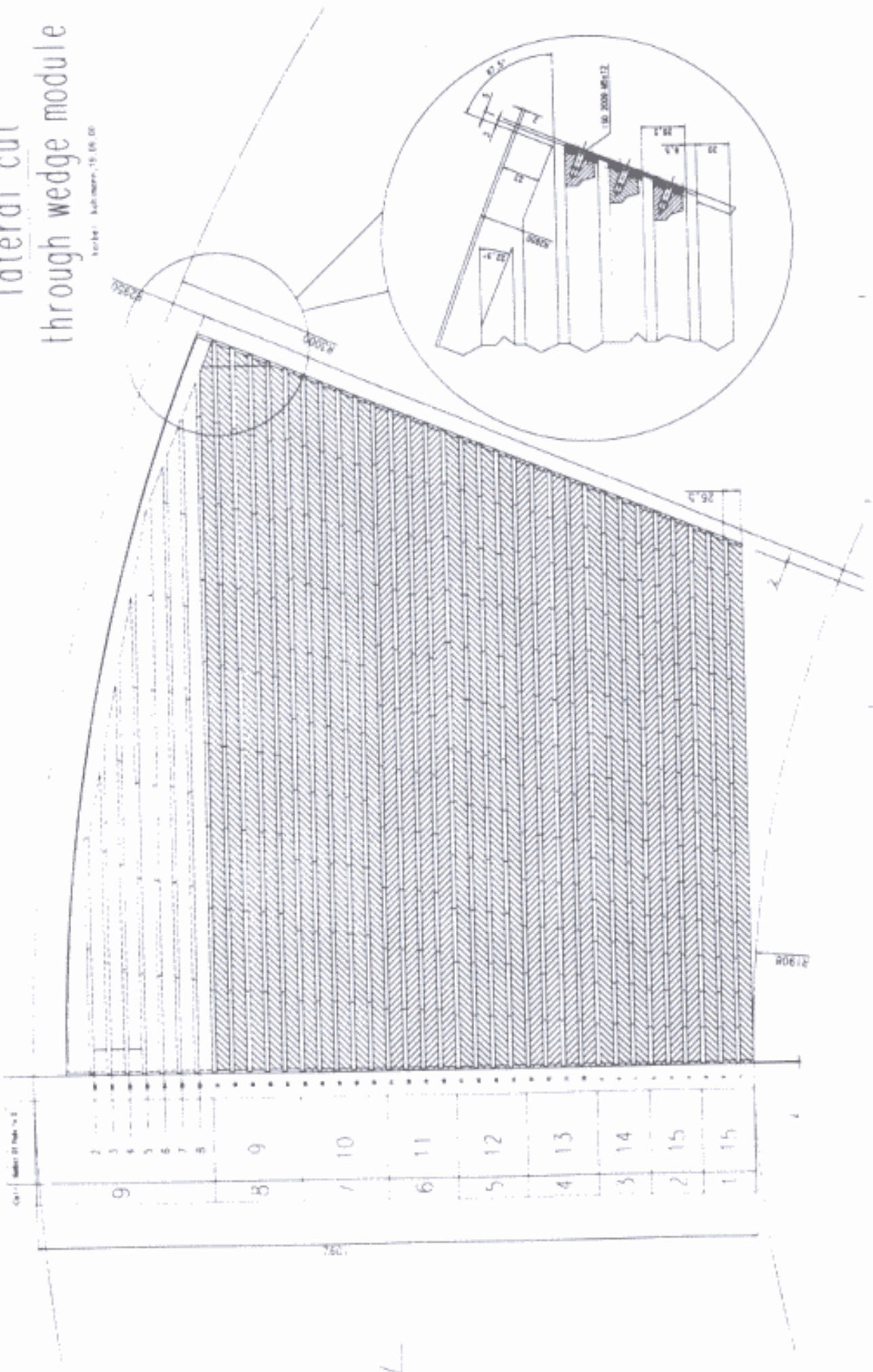
[3/4" = 1'-0" Vertical Scale]

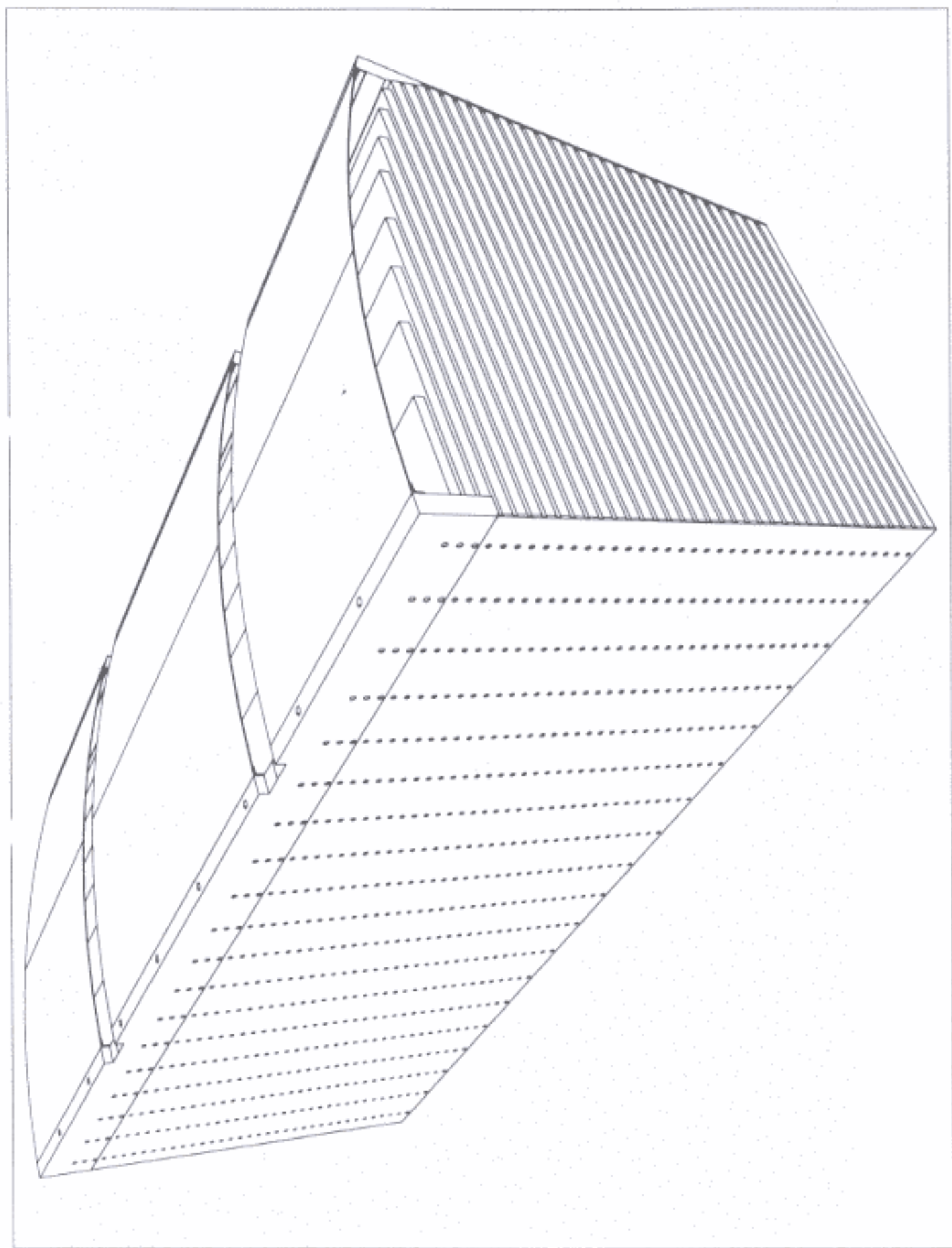
Sheet 2 of 2



HCAL barrel:
lateral cut
through wedge module

scale: 1:10000





/home/cmartens/linac/ux/collil.b.mf.

RESULTS: 3- B.C. 1, STRESS_3, LOAD SET 1

STRESS - VON MISES MIN: 1.18E+00 MAX: 1.67E+04

DEFORMATION: 1- B.C. 1, DISPLACEMENT_1, LOAD SET 1

DISPLACEMENT - MAG MIN: 0.00E+00 MAX: 2.21E-01 [mm]

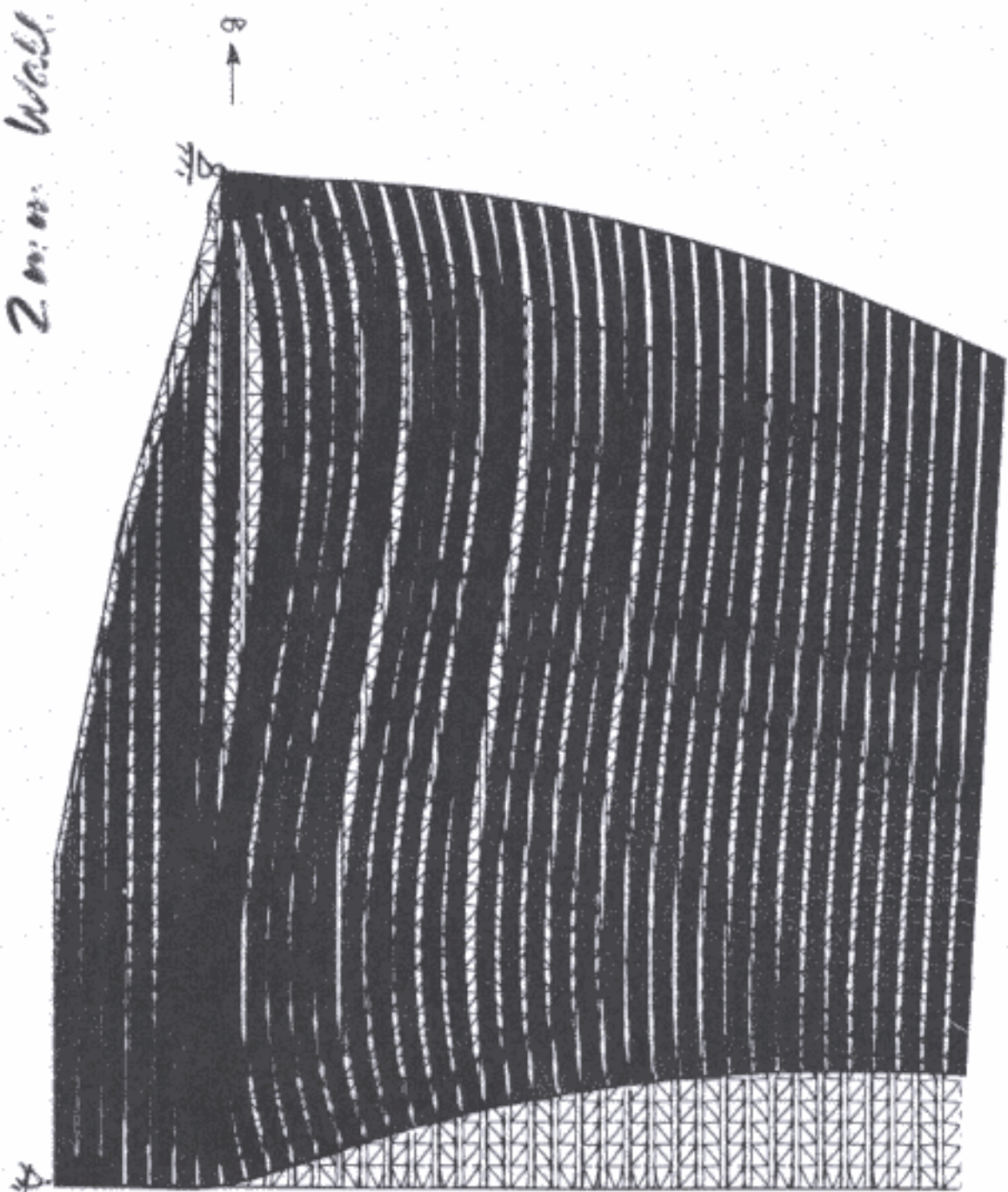
FRAME OF REF: PART

2 m. wall

[mm]

VALUE OPTION: ACTUAL

1.67E+04
1.50E+04
1.33E+04
1.17E+04
1.00E+04
8.34E+03
6.68E+03
5.01E+03
3.34E+03
1.67E+03
1.18E+00



/home/cmartens/linac/ux/coll11-a.mf1

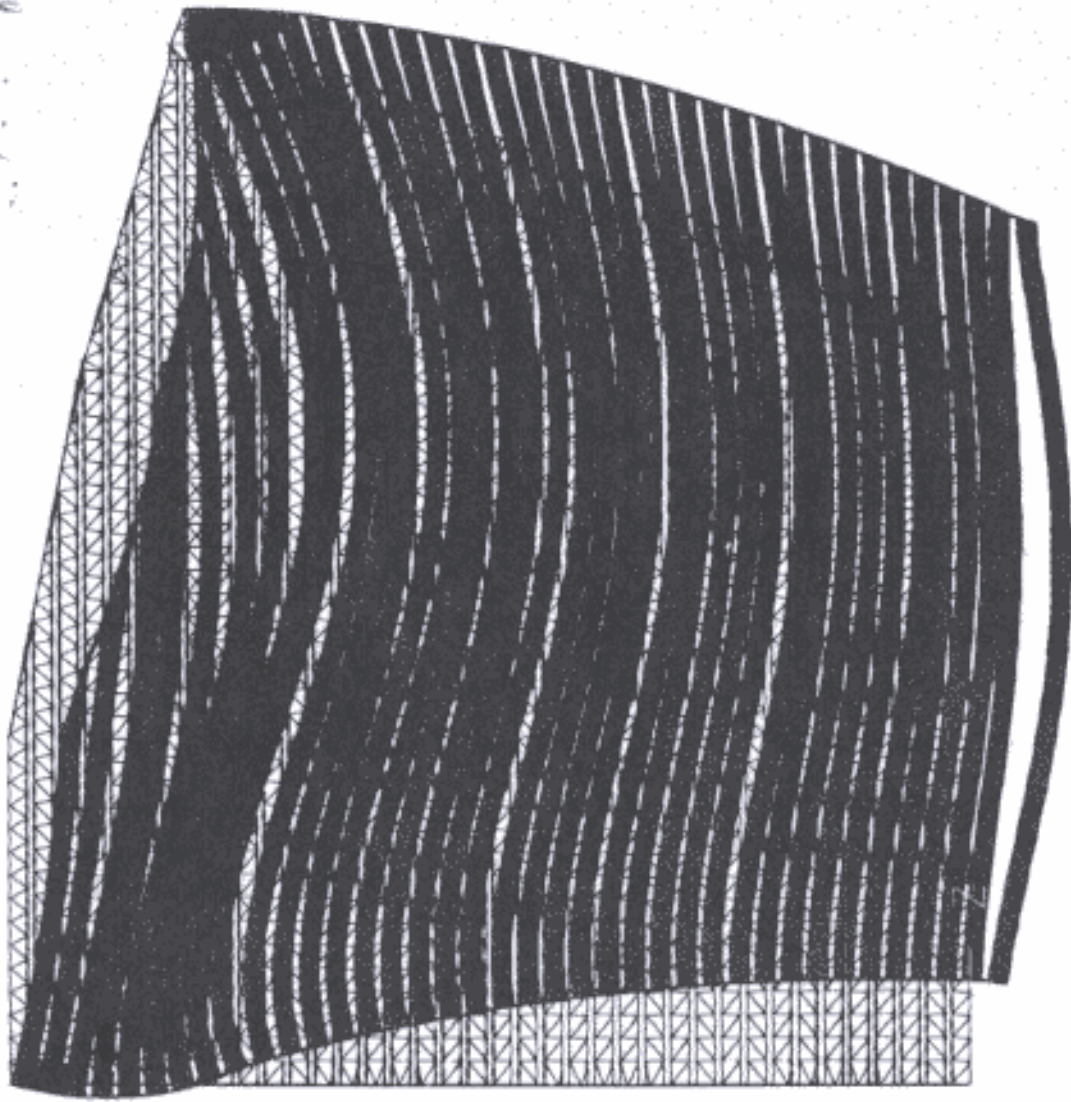
RESULTS: 3- B.C. 1, STRESS_3, LOAD SET 1
STRESS - VON MISES MIN: 6.67E-01 MAX: 1.53E+04
DEFORMATION: 1- B.C. 1, DISPLACEMENT_1, LOAD SET 1
DISPLACEMENT - MAG MIN: 0.00E+00 MAX: 6.54E-02 [mm]
FRAME OF REF: PART

VALUE OPTION: ACTUAL

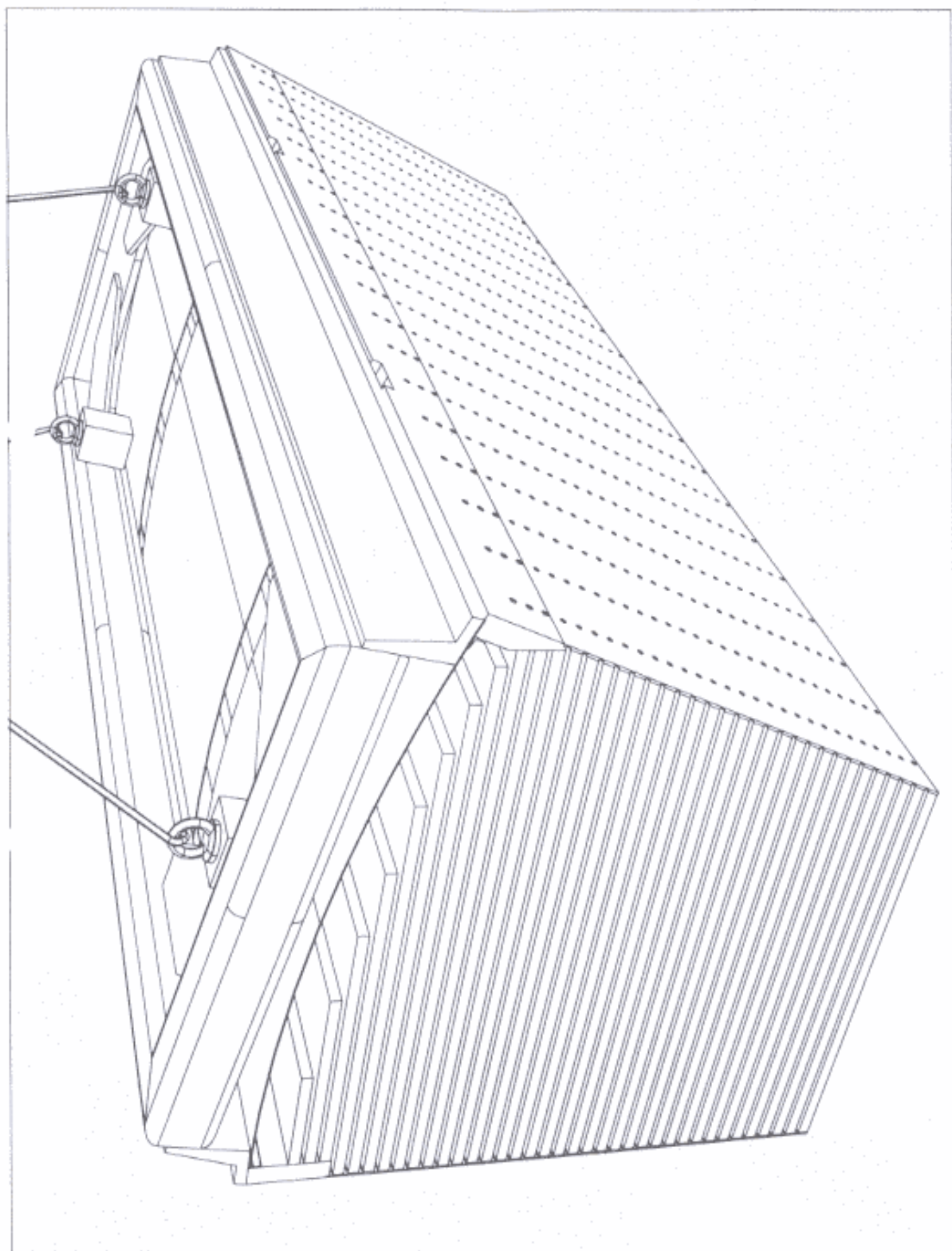
$\frac{N}{mm^2}$

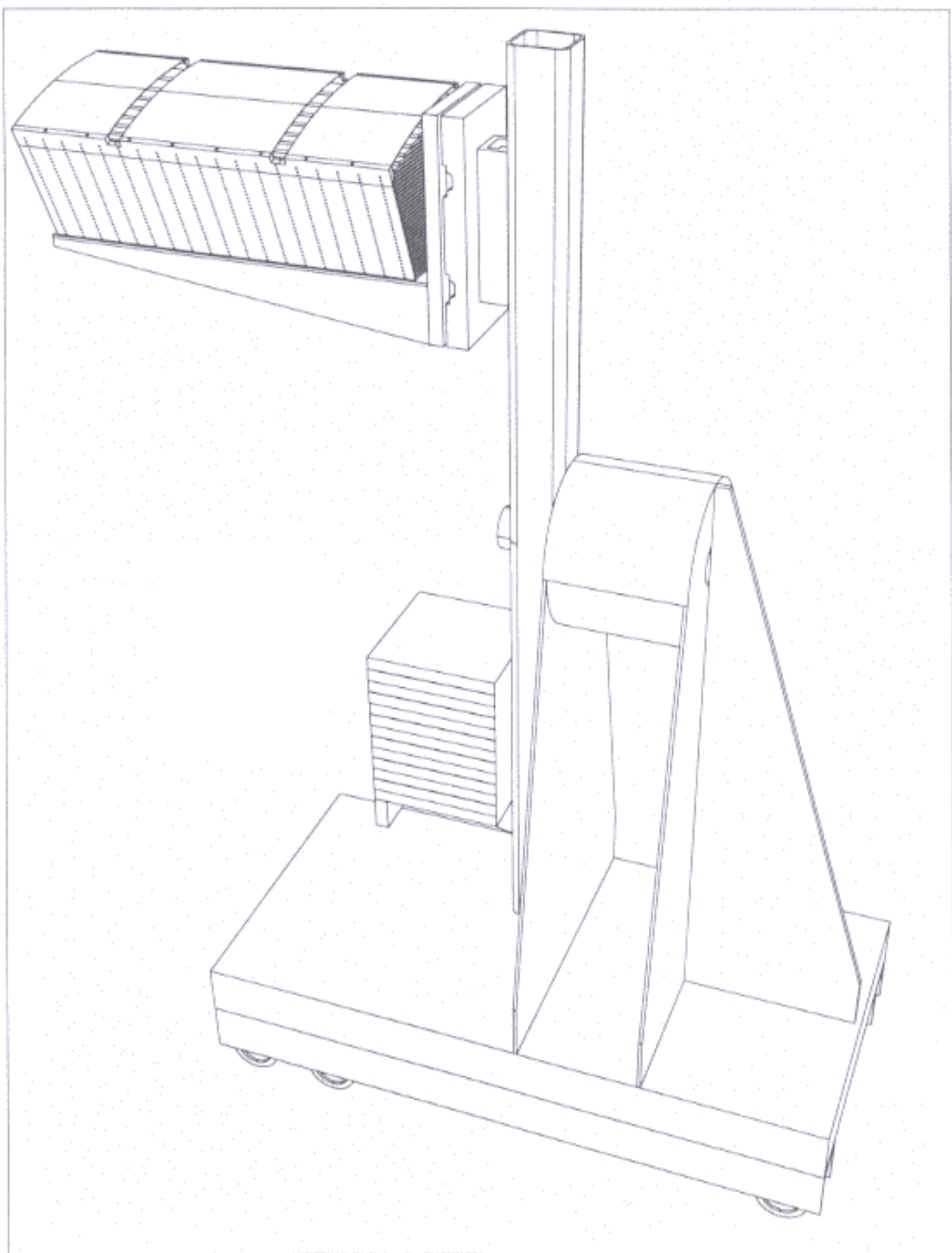
1.53E+04
1.38E+04
1.23E+04
1.07E+04
9.19E+03
7.66E+03
6.13E+03
4.60E+03
3.06E+03
1.53E+03
6.67E-01

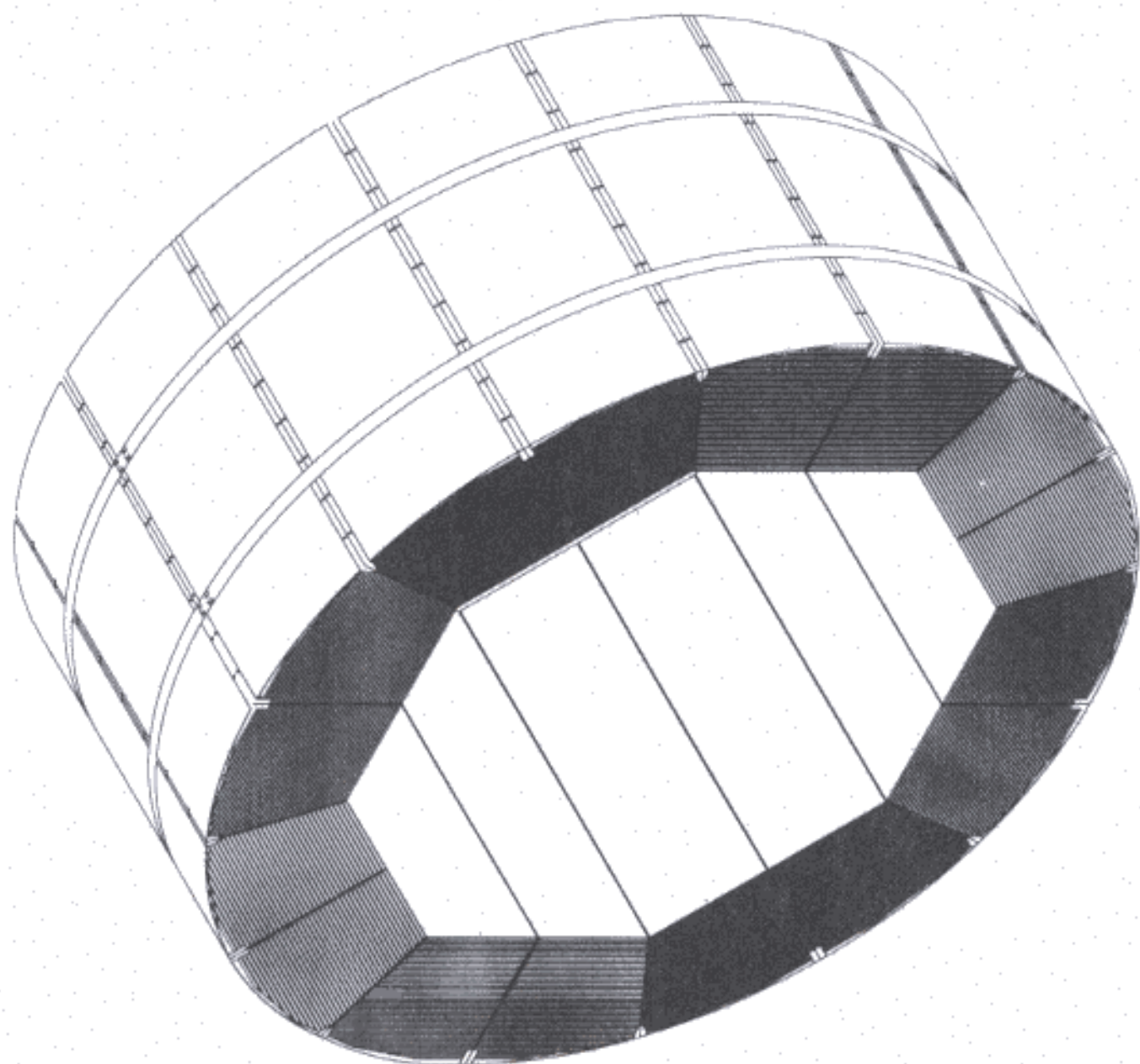
Collimator



↑

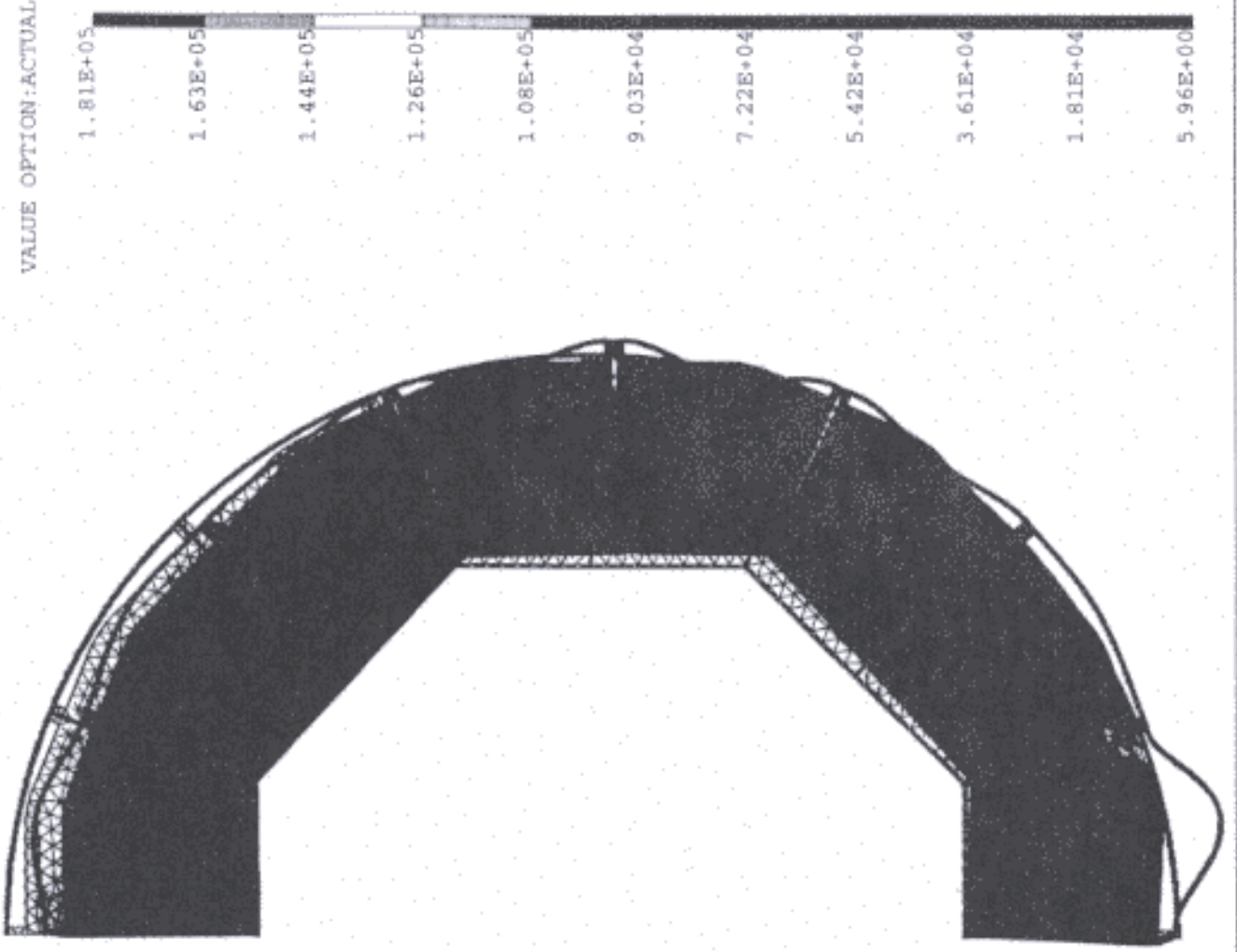






/home/cmartens/linac/ux/H-Cai_FEM-2.a

RESULTS: 3- B.C. 1, STRESS_3, LOAD SET 1
STRESS - VON MISES MIN: 5.96E+00 MAX: 1.81E+05
DEFORMATION: 1- B.C. 1, DISPLACEMENT_1, LOAD SET 1
DISPLACEMENT - MAG MIN: 0.00E+00 MAX: 5.59E-01
FRAME OF REF: PART



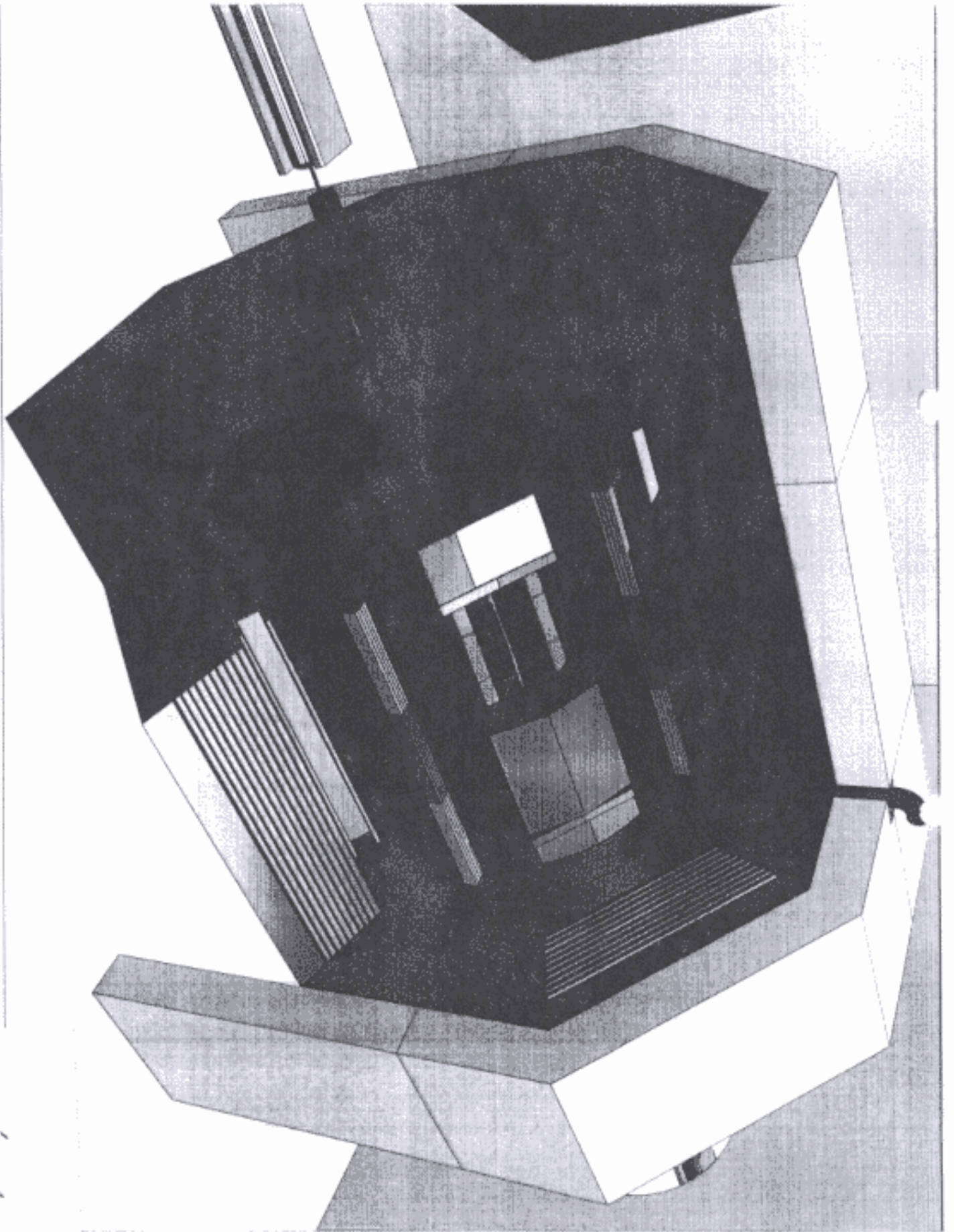


Fig 1