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Simulation on the DUMAND single string and
the muon string by use of "SNAPLD" program.

4/15/83 S. M.

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* "SNAPLD" program.

"SNAPLD" program was developed by the Naval civil engineering laboratory to model and simulate the cable system in the ocean. It takes account of current, surface exitation, drag of cable and modules attached on the cable, weight of them, cable tension (include slack and retensioning of the cable) etc. etc. The program was written originally for the CDC computer and used some specifications for it. They have been already fixed up and the program got executable on our Vax. Anyone who want to calculate a cable system underwater can use this program only giving it some data on the cable system and on the enviroment. 1)

* Results on the DUMAND single string.

We are very interested in how each mudule moves when the DUMAND single string is suffered the ocean current. Two kinds of simulation were done. One is to get a static solution and the other is to get a dynamic solution. A static solution means the string configuration after it reaches the equivalium. A dynamic solution means the transient solution of the string after the current chenges some ammount from zero.

The static solution is shown in Fig 1 and the dynamic solution is shown in Fig 2. In both case, current is 10 cm/sec indepedent on depth. At the top of the string, four empty Bentos spheres were assumed to be used as a bouy.

* Results on the muon string.

Unfortunately we lost the muon string last spring. The simulation was done to know why we lost it.

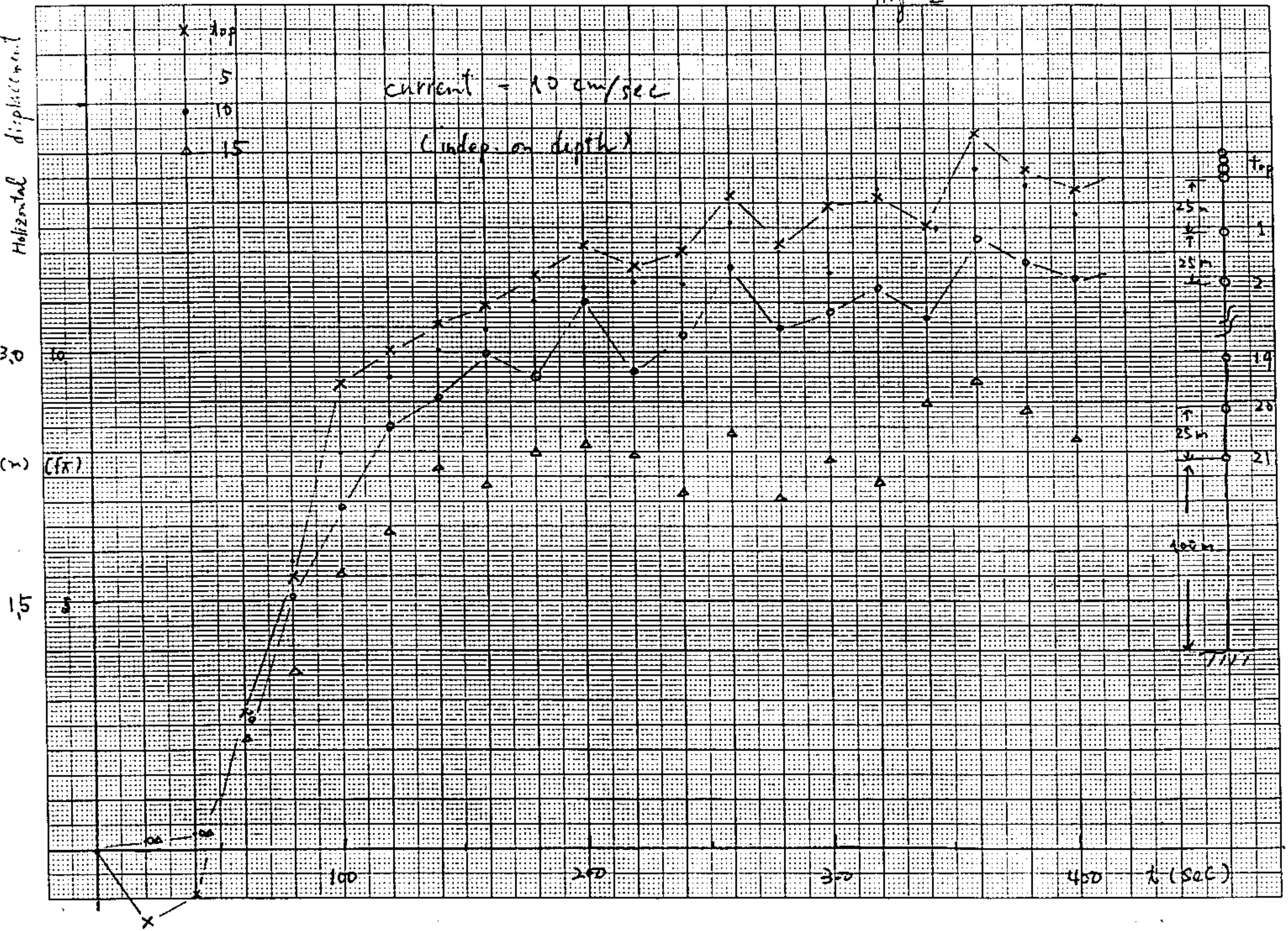
Resoluts are shown in Fig 3-5. Fig 3 shows the ship's vertical displacement that was used in this simulation. Fig 4 shows the cable configulation at t=100sec. Fig 5 shows the time variation of the cable tension just above the electronics package of the muon string. The limit of tension of the wire which was used in experiment is 20 short ton. From the results, we can easily recognize why we lost it.

* Reference.

1) F.C.Lin ; SNAPLD user's manual. N-1619, Naval civil engin. lab. Jan. 1982

Fig - 1

Fig-2



current = 10 cm/sec
(indep. on depth)
top
5
10
15
Holizontal displacement
3.0
(x) (ft)
1.5
100
200
300
400
t (sec)
25 m
100 m
1
2
19
20
21

-0.5

RANDØM VERTICAL DISPLACEMENT AT SURFACE

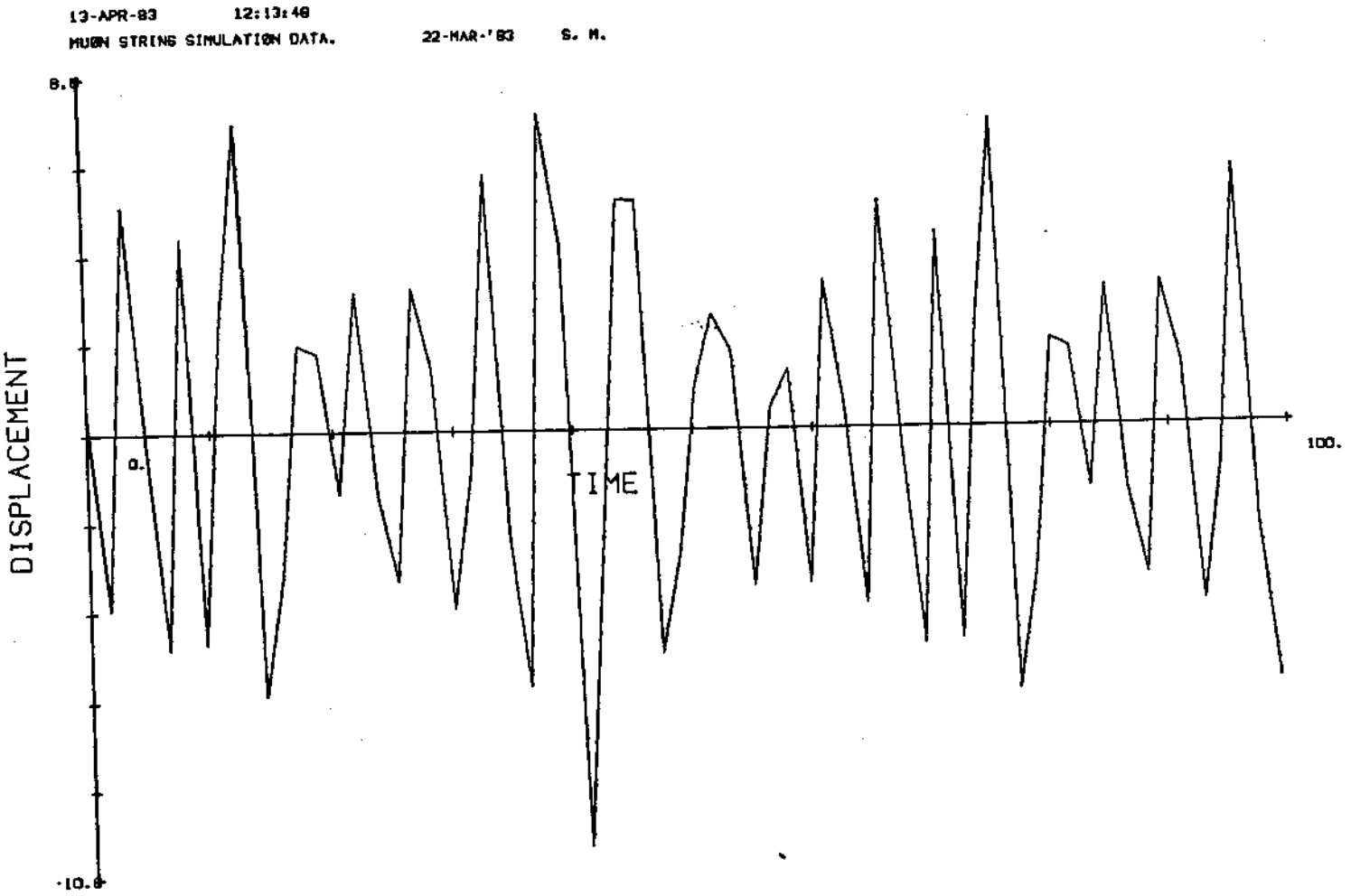


Fig - 3

NØDE PØSITIØN

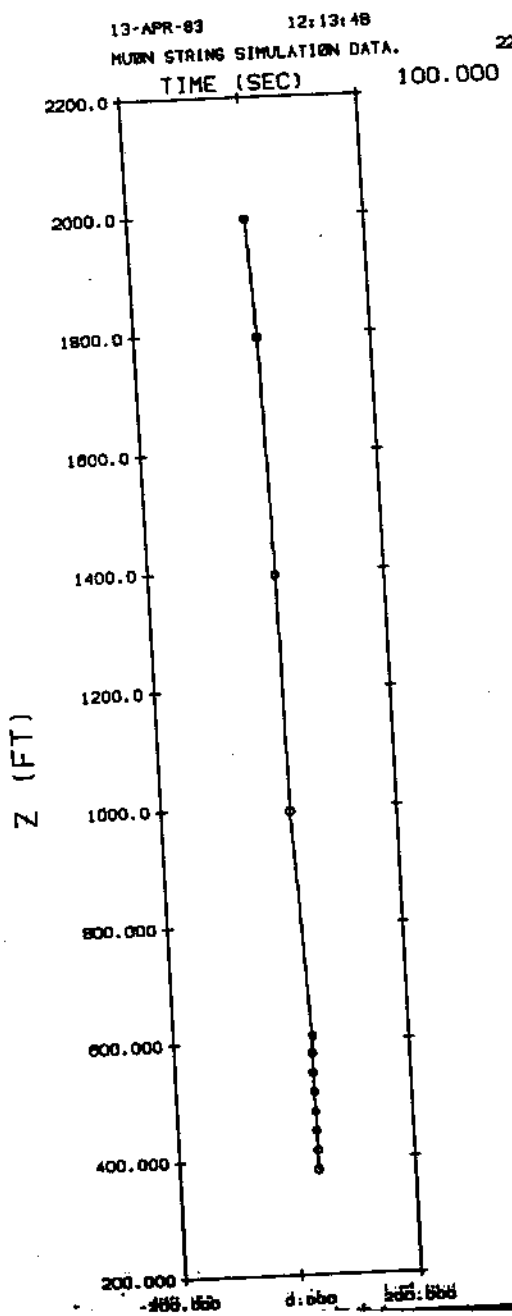


Fig - 4

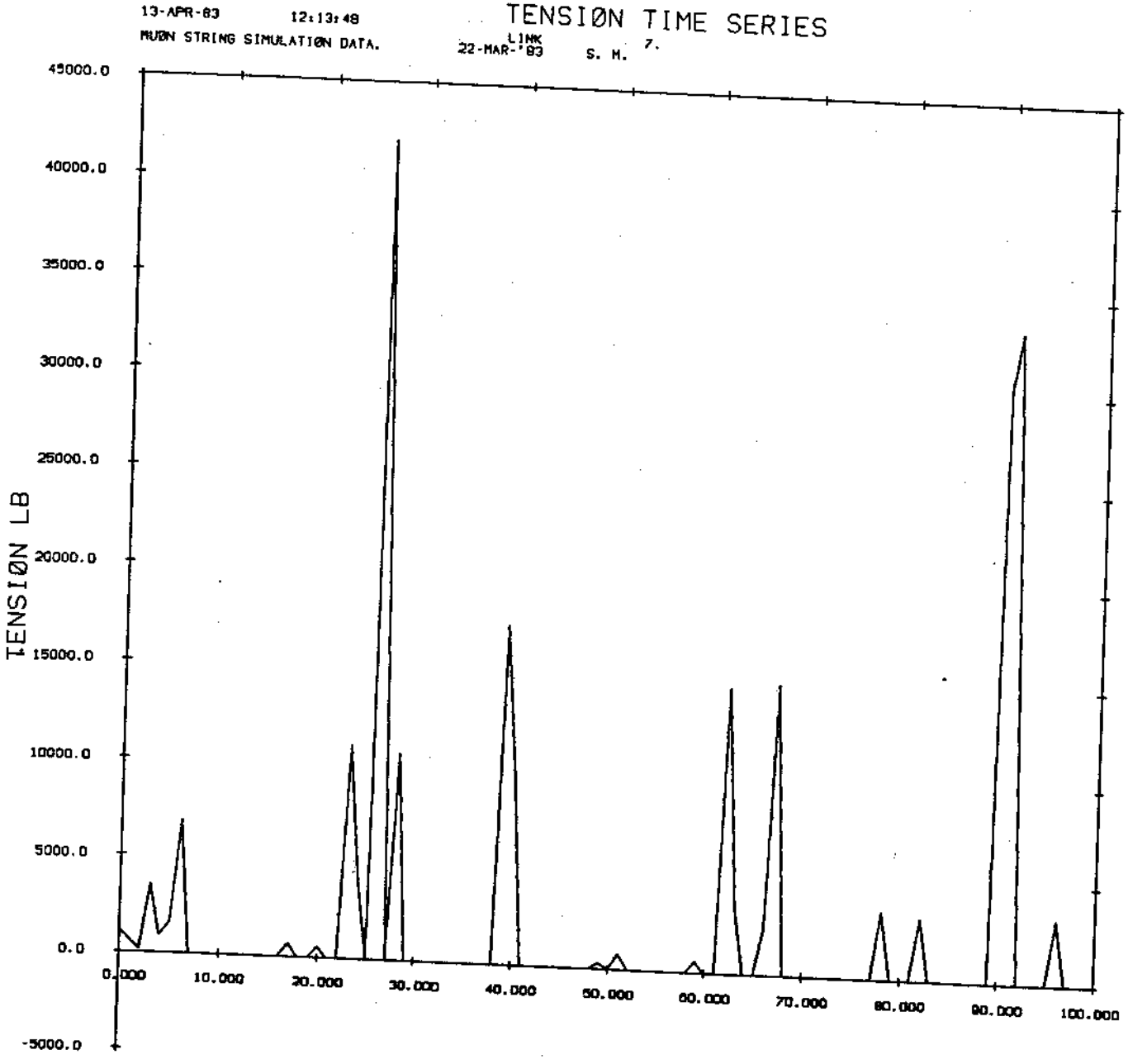

13-APR-83 12:13:48
TENSIØN TIME SERIES
RUØN STRING SIMULATIØN DATA.
LINK 7.
22-MAR-'83 S. M.
TENSIØN LB
45000.0
40000.0
35000.0
30000.0
25000.0
20000.0
15000.0
10000.0
5000.0
0.0
-5000.0
0.000
10.000
20.000
30.000
40.000
50.000
60.000
70.000
80.000
90.000
100.000

Fig-5