Safety Review of TOF Test Area

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BNL

Outline:

- Review of Run-7 Test Area
- Only changes w.r.t. Run-7:
  - -- Number of trays
  - -- Unistrut structure

- Unistrut structure, and rated load limits
- Near-term goals
- General testing plan

all supplies, cabling, and electronics already reviewed
no changes since Run-7

Run-7 Test Area

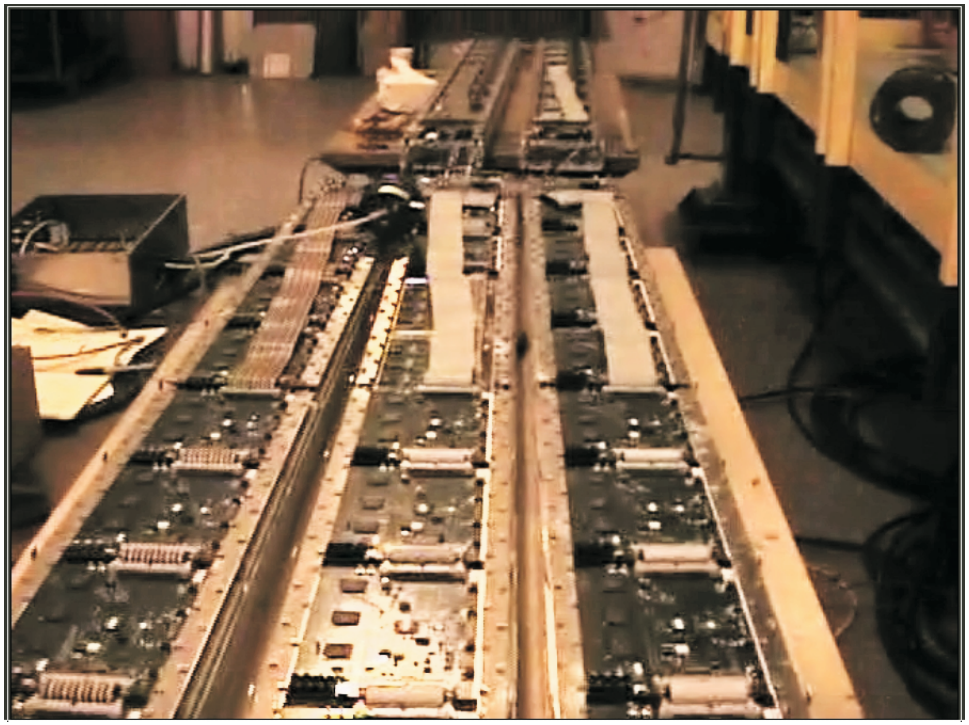
South side of WAH

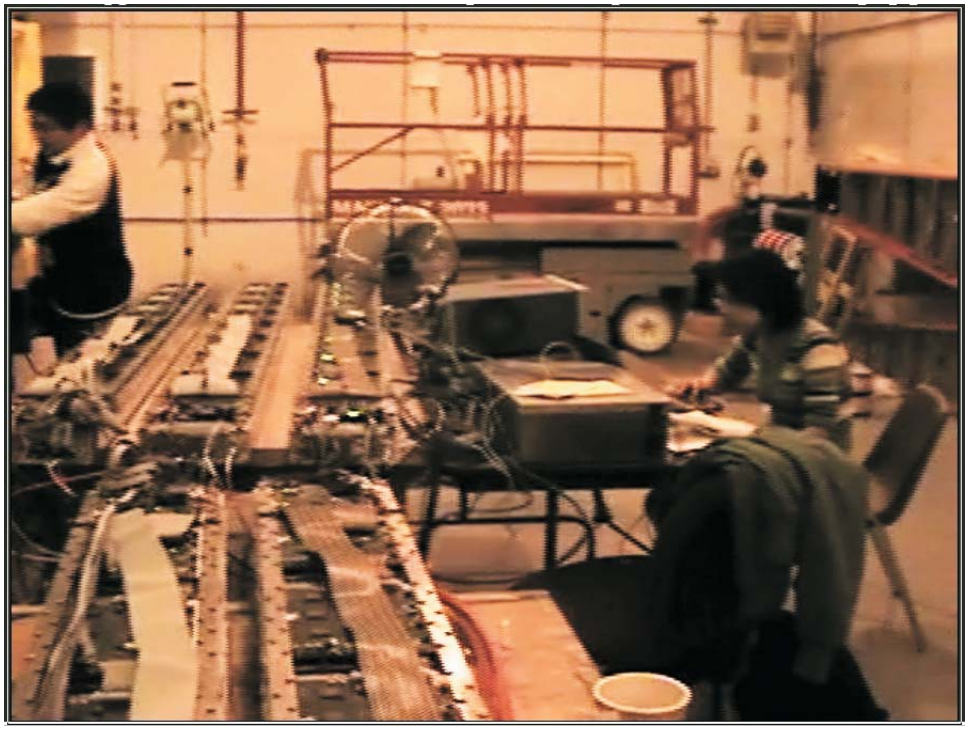
5 trays on two large tables, plus 3rd table for scope, computer, THUB, etc.... trays un-covered

Gas from TOFgas system, tap in w/ polyflow, route under STAR to test area...

HV from TOFhv system, two cables from supply to HVdistbox, then short cables to tray...
HV control and monitoring from GUI on tofcontrol machine...

LV from TOFlv system, one cable from supply to test area...





LV power only to one tray at a time

LV left on only long enough to collect noise rates (~1hr), then turned off

no water cooling

Replace three large tables with one unistrut structure....

eight levels, max 4 trays per level

1 5/8” steel unistrut, 1/2”-13 bolts

max 32 trays, each 75 lbs, so maximum 2400 lbs of trays on structure
top row may be out of reach - probably not used

Structure to be hard-tied to the south platform (STSG guidance)

Structure to be ground-strapped to south platform ground (STSG guidance)

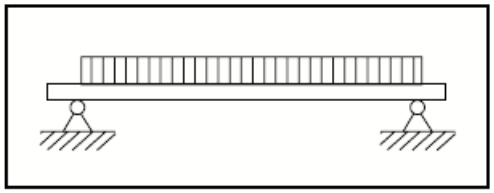
Each level has 3 beams and 4 trays → 300 lbs/row
actual load = **100 lbs per beam**
span is 40”

w/ safety factor = 2.5, max rated load ~ **1000 lbs**

Vertical distance between levels is 10”
300 lbs and 6 columns → **50 lbs/column/row**

w/ safety factor = 2.5, **max load is 3450 lbs**
for a 24” unbraced height.

BEAM LOADING - UNIFORM LOAD



A load spread evenly over a relatively long length of the beam is a uniform load.

BEAM LOADING – P1000

Span In	Max Allowable Uniform Load Lbs	Defl. at Uniform Load In	Uniform Loading at Deflection Span/180 Lbs	Span/240 Lbs	Span/360 Lbs
24	1,690	0.06	1,690	1,690	1,690
36	1,130	0.13	1,130	1,130	900
48	850	0.22	850	760	510

COLUMN LOADING – P1000

Unbraced Height In	Maximum Allowable Load at Slot Face Lbs	Maximum Column Load Applied at C.G. K = 0.65 Lbs	K = 0.80 Lbs	K =1.0 Lbs	K = 1.2 Lbs
24	3,450	10,750	9,900	8,770	7,730
36	3,050	8,910	7,730	6,370	5,280
48	2,660	7,250	5,980	4,660	3,770
60	2,290	5,890	4,660	3,600	2,940
72	2,000	4,800	3,770	2,940	2,380
84	1,760	4,010	3,170	2,460	1,970
96	1,570	3,450	2,730	2,090	1,650

COLUMN LOADING – P1001

Unbraced Height In	Maximum Allowable Load at Slot Face Lbs	Maximum Column Load Applied at C.G. K = 0.65 Lbs	K = 0.80 Lbs	K =1.0 Lbs	K = 1.2 Lbs
24	6,430	25,060	24,620	23,900	23,050
36	6,230	24,000	23,050	21,570	19,890
48	5,950	22,590	21,030	18,690	16,170
60	5,620	20,890	18,690	15,540	12,400
72	5,240	18,990	16,170	12,400	8,960
84	4,830	16,970	13,640	9,470	6,580
96	4,390	14,900	11,200	7,250	5,040

Initial Goals

mechanical

reassemble test-stand, and mechanically attach to edge of south platform
install trays on test stand
all trays are tested covered this time (different from run-7 test area setup)

gas distribution

same as Run-7, except now have TOFgas system fan-out panels on North Platform
tap 5-6 lines out and 5-6 lines return from gas distribution panels in 2nd floor North
polyflow running underneath STAR

5-6 trays per supply&return loop.

HV

New cables arriving monday (final & same as run-7)
Supply now on first floor of south platform (final & same supply as run-7)
3 HV distboxes at test area (final & same as run-7)
each provides HV to 8 trays

Grounding

green wire everywhere
from grounding post on each tray to south platform (loop as for CTB)
from each HV distbox to south platform
from test stand unistrut to south platform

Next Goals

LV

use final cabling and supply (now in rack row 1B South)
one cable for entire test stand
only one tray at a time is LV-powered

Overview of Installation and Testing Schedule

June 29 — 30 TOF trays arrive at BNL
Llope, Biritz, Kajimoto, Ruan are initial work crew. Eppley also onsite periodically. Llope/Eppley are STSG liaison.

Week of June 30

re-assemble test stand, mechanical attachment to South platform
unpack trays from truck and boxes
load trays A, B, 6, TOFr5 (& some CTB if possible) into truck + empty boxes, truck returns to Texas.
make gas system connections
make hv connections
install all grounding straps
get approval for gas flow (freon-only) and HV power up
trays sit for several days just flowing gas. monitoring is automatic at tofgas station in mixing room

other goals: discuss ideas re: installation fixture with Scheblein, Christie, etc
finalize locations for HV distboxes on endrings, finalize West locations first
discuss/review the plan and budget for the final water cooling system
discuss/review the plan and budget for theTPC support fixture

Week of July 7

power up HV, carefully collect & study current flow data over several days
make LV connection to supply (if necessary), route cable to test area under STAR
make canbus & data connections to THUB and laptop/tofcontrol
get approval for LV power up

LV power to one tray at a time
collect noise rates, search for dead channels, data corruption, etc

Early August — begin installation of first batch of trays in positions 19-50 West, skipping positions behind TPC support arms
install THUB at 8 o'clock west
remove (Run-7) trays in positions 76-80 (some electronics need to be replaced)

Mid September — next batch of 30 trays arrives
repeat same test suite in test stand at south side of WAH (2 weeks)
complete West ring of TOF trays (requires TPC support fixture)
install THUB at 2 o'clock West

Depending on RHIC schedule, then move on to the East ring