

DCA316 Production Report

DCA316 is the sixth complete 50 mm SSC dipole magnet built at Fermilab and the fourth that was assembled by General Dynamics personal. It is built according to the specifications in "50 mm Collider Dipole Magnet Requirements and Specifications", Baseline Issue, August 16, 1991 ("The Yellow Book"). It contains no intentional deviations from the baseline design.

Coil winding and curing

The resin content of the glass wool tape used in the lower inner coil was slightly greater than the specification (DR084). Other DR's were for minor insulation scratches and dirt on the end parts. They are:

DR 175 112 176	for coil #1015
DR 142 144 112	for coil #1014
DR 146 150 161 162	for coil #2015
DR 181	for coil #2014

The coils used in this magnet are summarized as follows. These coils all passed the electrical check with no failures.

Coil	number	oversize	cable numbr	koldweld
Upper Inner	15M50-1014	+9.52 mil	3-O-00034	6
Lower Inner	15M50-1015	+9.87 mil	3-O-00037	6
Upper Outer	15M50-2014	-1.14 mil	4-K-00021	
Lower Outer	15M50-2015	-1.33 mil	4-K-00021	

The averaged coil sizes were very well controlled at this stage of production. However, the coil size distribution had large variation as shown in Fig.1. This has been an unsolved problem in this series of production coils. The gage pack position was assigned to the minimum and maximum size of inner coils *i.e.* 57" and 9" toward the lead end from the center of the magnet (TS-SSC-92-020).

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Collaring

Voltage tap 19A became open in the preparation stage of the collaring (DR200). The coil package was disassembled and the tap was repaired. The beam tube was found to have a smaller inner diameter (DR190) than specification but was used after checking it was larger than the mole size (1.615"). The first keying trial failed at 21-28 feet from LE. The key was sticking out by 1/16". It was keyed successfully in the second trial (DR212). The ground insulation of the outer upper coil was moved at out of position during assembly (DR223). It was corrected as much as possible after collaring. The compensation gauge in the upper outer coil on the lead side occasionally failed. There is another compensation gauge of about the same R0 value in the lower coil, which can be substituted for the failed gage. The pressure change in the coil during the assembly process shown in *Fig.2* is the corrected data. The field component measurement had a little confusion in the polarity because of unverified new software in newly introduced UNIX system. -2.52 unit for sextupole and 0.394 unit for decapole is the corrected average value over the length. Other miscellaneous DR's on replaced parts and usage of glue are DR196, 197 and 231.

End Clamp

The end diameter of the coil-insulator package at the RE seemed smaller than previous magnets. Two layers of 5 mm Kapton was used (TS-SSC-91-186) between the coil and G10 blocks in the RE, while the LE had one layer of Kapton (TS-SSC-91-187). The installation of the end collet needed a little trimming in the ramp splice groove (DR232). The installed end can slid out again over night (DR234). It had to be re-squeezed. A too long saddle in the inner coil at the RE was cut (DR235).

Yoking

Yoking went smoothly but the yoke skin did not maintain round shape. The end plate was machined down by 38 mil to fit into the skin (DR330). The coil pressure after the yoking was 12.5 to 11.0 ksi in the inner coil and 4.6 to 5.6 in the outer coil. The outer coil has a little lower pressure than the design but, considering recent magnet behavior, these are rather close to the ideal pressure. The first ESR (Electron Spin Resonance) measurement was made for this yoked assembly. *Fig.3* shows the measured result. The field angle measurement data was taken twice and showed a large change in the pattern. Whether this is a real twisting motion or not is being investigated by M.Kuchnir. Other DR's for this

stage concerned on fixed thred and measurement errors are 296, 323, 335, 340, 348 and 356.

Cryostat

There were size and position errors in the cryostat assembly but they were not serious. Issued DR's are 372, 382, 415, 418 and 423.

DCA316 Coils (II/IV side)

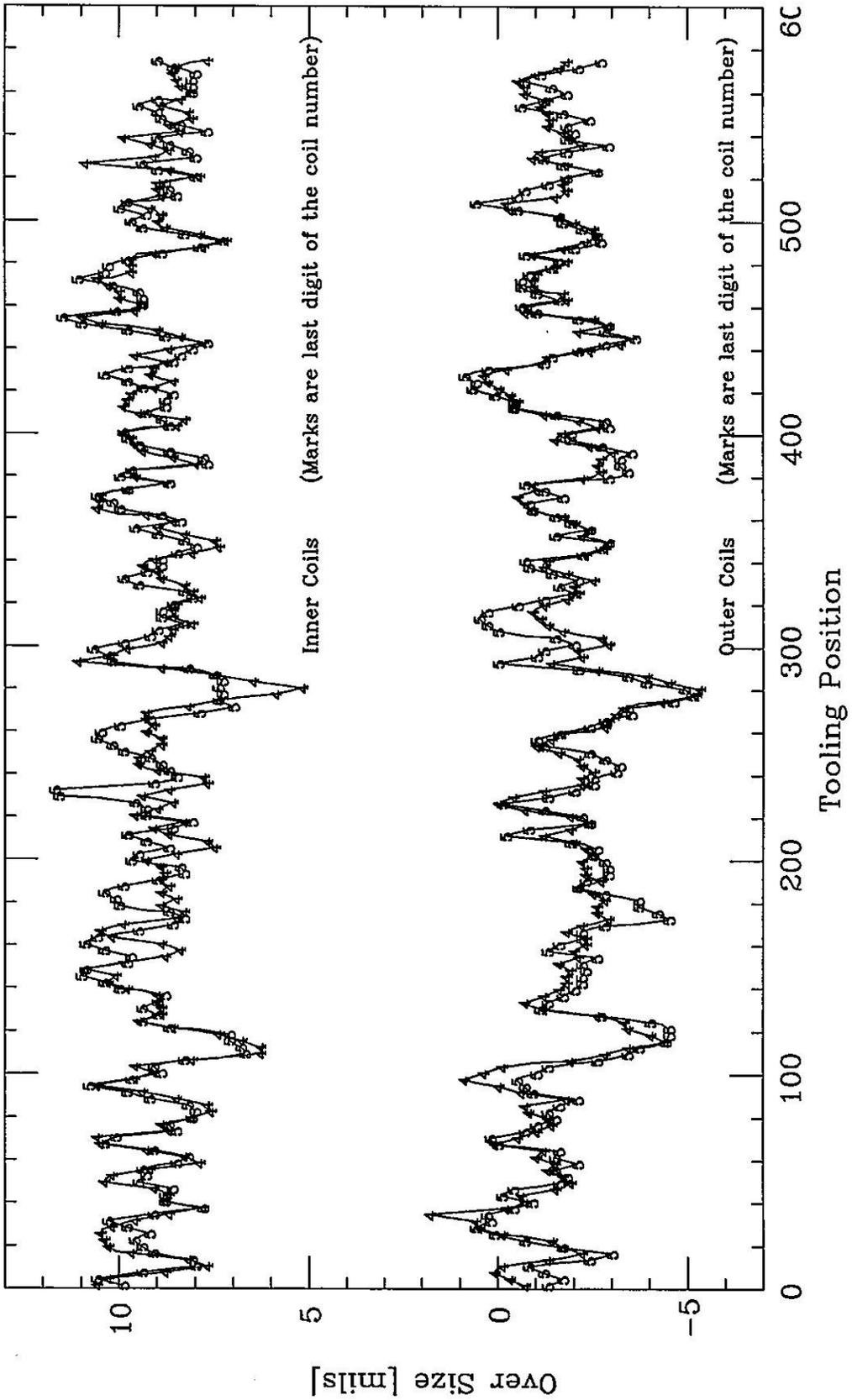


Fig 1-B

DCA316 Coils (I/III side)

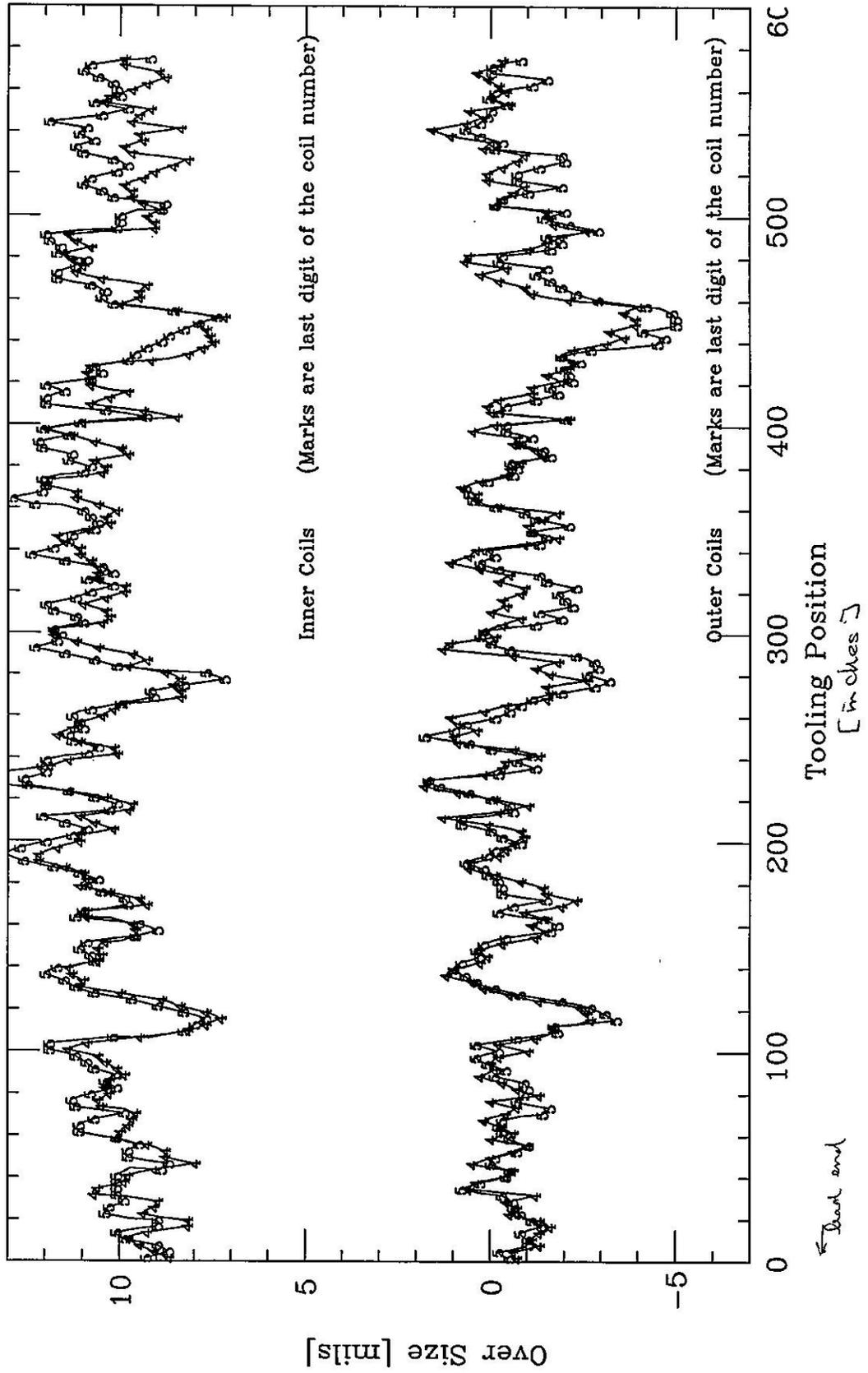


Fig 2

ESR Measurement Results:

