

PROGRESS REPORT ON RCBC

R W Newport

1. CHAMBER AND VACUUM ASSEMBLY

1.1 Chamber Assembly

The welding and machining of the chamber has been completed and pressure tested satisfactorily. The assembly has been vacuum tested satisfactorily.

All heat exchangers have to be indium soldered to the chamber assembly, the valve vessel has to be fitted and all pipes have to be welded to form complete systems or circuits.

The promised completion date is at the end of June - but this is dependent on there being no significant snags. So far this has not been the case, some weeks having been lost due to alignment problems and repeat operations on welds.

The chamber assembly will, when complete, be delivered directly to CERN and Morfax have made provisional arrangements for this. The assembly will be bolted to a support frame and placed in a covered lorry. It will be accompanied by RL staff.

1.2 Main window

Both the main window and the spare have been sent to CERN after satisfactory pressure testing at RL.

1.3 Window gasket

Manufacture is proceeding at Morfax. Jigs and fixtures have been made and the support rings are being machined. Delivery of the first gasket is expected before the end of July.

1.4 Vacuum tank. The modified optics end section and the chemically etched central section have been delivered to RL. The centre section has been wrapped with GRP and after curing will be pressure tested with the optics section and the optics end plate. The optics end plate has been delivered, has auxilliary pipes welded to it and has been fitted with aluminium windows and the hydraulic pressure tested at 9 bars. The superinsulated spillage shields have been made.

1.5 Beam entry and exit windows The spare beam exit window has now been delivered.

1.6 Hydrogen shield end plate. The hydrogen shield end plate, with pump out pipes and radiation shield and heat exchanger assemblies has been delivered.

The indium plating of the heat exchangers and the plate is partly complete and has been prepared for pressure testing.

2. OPTICAL SYSTEM

2.1 Telecentric lenses. Complete and ready for delivery to CERN.

2.2 Lens mounting plate. Complete and waiting for trial fitting of the illumination systems.

- 2.3 Illumination systems. All optical components and the light box castings have been delivered. The boxes are out for machining and assembly. The power supplies have been delivered and tested and one of the two racks delivered to CERN, albeit damaged during unloading.
- 2.4 Small windows. All camera windows have been delivered and anti-reflection coated. We are still awaiting the last two intermediate vacuum tank windows from Grubb-Parsons but the two spare windows have been finished by Optical Surfaces. All delivered windows have been individually pressure tested to 9 bars.
- 2.5 Data board. The prototype systems has been working on LEBC. Some optical components have still to be obtained for the final system.
- 2.6 Cameras. The two prototypes have been working satisfactorily on LEBC, though the gates need to be blackened to avoid loss of contrast due to back scattered light.

3. CHAMBER CONTROL SYSTEM

- 3.1 Valve vessel. The valve vessel has been completed mechanically and delivered to Morfax. Some thermal instrumentation has yet to be completed at CERN.
- 3.2 Control system. Despite the delays in agreeing the synoptic manufacture the assembly is well advanced.

4. EXPANSION SYSTEM

- 4.1 Piston-bellows assemblies. The second assembly is being prepared for installation in the chamber, including a modified coupling to the drive shaft.

The first assembly is being held in reserve and will be on display at the RL Open Days.

A third assembly is being prepared with modifications to take account of the information obtained during the tests of both the full assemblies and the joint rig.

- 4.2 Bellows. A modified fabrication procedure is being established to reduce the risk of surface crazing. Tests of sections are planned to check the resulting bellows.

5. VACUUM SYSTEMS

- 5.1 Mechanical systems. Four of five Roots rotary systems have been delivered to CERN and the fifth is to leave RL this week.
- 5.2 Diffusion pumps. The diffusion pump assemblies have been trial fitted to the valve vessel and had some of the interconnecting pipework assembled before the valve vessel was sent to Morfax. They have been pressure tested to 14 bars.
- 5.3 Pump-out panels. Both warm and cold pump-out panels have been delivered to CERN and installed in the hydrogen area.

6. MECHANICAL HANDLING

All handling equipment has been delivered and as far as possible tested with the actual components, including the trolley. Both the trolley

and the equipment have been delivered to CERN.

7. ACCESSORIES FOR CONTROL AND MONITORING

7.1 Panel modules. Some 28 of the 35 modules have already been delivered to CERN.

7.2 Pressure transducers. The Kulite transducers have proved to be unsatisfactory after assembly and a Bell & Howell unit has been welded into a spare housing. This will now be tested.

8. IRON STRUCTURE

Nothing to report.

9. TRANSPORT TO CERN

Proceeding as planned, though there have been handling problems.

10. PROGRAMME

10.1 In UK. This part of the programme is primarily concerned with the delivery of outstanding items, ie. the chamber assembly, the window gaskets and the illumination systems, and the completion of certain key items such as the hydrogen shield end plate, the vacuum tank and a few control panels before shipment to CERN.

The chamber and the gasket remain the crucial items, the former must be in CERN by mid-July if no further delay is to result from its late delivery.

10.2 In CERN. A detailed assembly and test programme has been produced and shows a first cooldown to be possible before the end of 1980. This programme does not, however, anticipate any significant problems and assumes that resources (manpower, space, cranes, etc) at CERN are not too restricted, and clashes with other programmes, eg the magnet programme and the SPS maintenance schedules, are not significant.

The key points in this programme which contains some 130 items are as follows:

Chamber pressure and vacuum test early September 1980

Vacuum tank pressure and vacuum test end September 1980

Complete assembly for first cooldown mid-November 1980.

11. FINANCIAL

11.1 The commitment has now reached £907,803.

11.2 All major commitments apart from transport costs and additional charges at MORFAX have been made.

11.3 The estimated cost has now exceeded the original estimate by ~17%.

26 June 1980.

FINANCIAL STATEMENT
 RAPID CYCLING BUBBLE CHAMBER FOR EHS CERN
 PROJECT NOs NA71500 - NA71799 INCLUSIVE
 PROGRESS STATEMENT AS AT 1.5.80

	INITIAL COST ESTIMATE 15.2.77 *	LATEST COST ESTIMATE 1.5.80 *	COMMITTED TO 1.5.80	FORECAST DELIVERY DATE	TOTAL SPEND IN PRIOR YEARS	ACTUAL SPEND IN CURRENT YEAR TO 1.5.80	SPEND FORECAST 1981/82
	£	£	£		£	£	£
1. Chamber & Vac Enclosure	297,235	332,827	397,690	15.7.80	221,417	5739	-
2. Optical System	86,925	93,468	119,991	15.9.80	32,874 ^c	1064 ^c	-
3. Chamber Temp Control	46,640	46,640	49,370	15.7.80	52,431	1097	-
4. Expansion System	58,488	64,071	59,420	15.7.80	50 ^c	- ^c	-
5. Vacuum Systems	36,559	55,000	69,710	30.6.80	55,526	801	-
6. Acc for Control etc	17,798	17,798	17,038	31.7.80	14,341	3041	-
7. Mech Handling Equipment	29,120	45,600	48,032	30.6.80	12,293	3661 ^c	-
8. Iron Support Structure	78,000	118,956 [†]	138,333 [†]	Delivered	138,333 [†]	-	-
9. Transport to CERN	18,200	18,200	8,216	-	8,162	888	-
10. Miscellaneous	1,040	1,040	3	-	3	-	-
	670,000	793,600	907,803	-	535,430 ^c	15,570 ^c	250,000 ^c

Contract price £670,000 (+15% contingency)

* at 15.2.77 prices.

All prices exclude VAT

†£9500 will be paid from another CERN budget.

^cNot including payments by CERN.