

PROGRESS REPORT ON RCBC

R W Newport

1. CHAMBER AND VACUUM ASSEMBLY

1.1 Chamber Assembly

Longitudinal welding of the support tube and hydrogen shield was completed satisfactorily in July and the support tube has been welded to the support flange. The top heat exchanger has been assembled onto the top plate. Despite this progress MORFAX have issued a revised programme showing delivery of the chamber at the end of 1979 instead of early in October. They have been affected by a national engineering strike since July which cut their output by 35% and since the beginning of September this has been further reduced to about 50% so that even the revised delivery date is in jeopardy. The effect on the overall programme will be discussed later.

1.2 Main Window

The fiducial marks were put onto the window during July. The window flange, and the window test rig are expected early in October.

1.3 Window Gasket

Although the first spinnings for the window gasket were delivered in July they were not considered to be satisfactory and we are investigating the production and use of pressings with a number of manufacturers including the CERN main workshops. It is still anticipated the first gasket will be available for the first assembly of the chamber at CERN.

1.4 Vacuum Tank

Testing of the individual sections of the vacuum tank is proceeding at IMI Marston and the acceptance tests are planned for the end of this month. In order to avoid clashing with the installation of the magnet cryostats it is now planned to deliver the tank directly to CERN for trial fitting in the iron structure during October and then to return the optics end section to RL for pressure testing of the end plate.

1.5 Beam Entry and Exit Windows

We have taken delivery of the first satisfactory beam entry window, a second is due shortly. Both have been subjected to shot peening.

The first exit window is unlikely to be accepted for use. The second window has been machined, rolled and annealed and forming will start after some modification to the form of the mould.

2. OPTICAL SYSTEM

2.1 Telecentric Lenses

We have taken delivery of the first lens and expect the other three to follow at roughly six week intervals. Under test the first lens behaved as specified and provisional photographic tests show the flash energy requirements to be as anticipated.

2.2 Lens Mounting Plate

This is being machined and is due for delivery at the end of October. The lens plate supports have been manufactured.

2.3 Illumination System

The design has been completed and costs obtained for castings for the light boxes.

The power supplies for the illumination system are almost complete.

2.4 Small Windows

We are still awaiting delivery of these windows from GRUBB-PARSONS after a series of discussions with them concerning the standard of polish required.

2.5 Data Board

The prototype system for use on LEBC has been prepared for tests. Both the software and hardware for controlling the relays is well advanced. Schemes have been produced for increasing the number of available channels in order to cover high resolution cameras.

2.6 Cameras

Camera 1 has been assembled and has operated satisfactorily. Components for cameras 2 and 3 have been delivered but will be used for LEBC. To enable the complete system to be ready for the first cooldown camera 2 will be wired up using the spare components and camera 3 completed using these same components so that on completion of LEBC operation about one month will be required to complete camera 2.

2.7 Fiducial Marks

These have been put onto the main windows and a survey carried out.

3. CHAMBER TEMPERATURE CONTROL

3.1 Valve Vessel

The pipework has been completed and accepted after pressure and vacuum testing. Since there was some deformation of the bellows sealing the valve shafts during the pressure test on the pipework, the bellows attachments are being modified.

The radiation shields and insulation are now being fitted to the inside of the vessel.

3.2 Control System

Assembly of the units has started.

4. EXPANSION SYSTEM

4.1 Bellows

The sixth bellows is now being machined.

4.2 Bellows Test Rig

The first piston-bellows assembly was successfully tested in the modified MAQUETTE for over 5 million cycles. Points to note from the tests are as follows:

1. No apparent deterioration of the piston or bellows apart from some fine surface crazing in the resin-rich surface of the bellows.
2. No evidence of resonances in the p-b system even under square wave excitation of the hydraulic system.
3. Satisfactory performance of the drive shaft seal though some wear was observed. This will be improved by changing the materials used in making the seal housing.
4. No problems associated with the samples of Scotchlite attached to the piston face.
5. Failure of the indium seals on both the p-b assembly and the MAQUETTE, almost certainly due to deflections in the MAQUETTE.

4.3 Piston - Bellows Assembly

4.1 Second prototype

As a result of the tests on the first prototype the second prototype is being prepared for a short test in the MAQUETTE. The only changes will be to the indium seals and the seal housing.

4.2 First prototype

This is being prepared for installation in the chamber.

4.4 Stainless Steel Bellows

The first such bellows has been made and an attachment is now being designed.

5. VACUUM SYSTEMS

Concern over the performance of the Roots-rotary pump combinations has now been resolved and two further units are available for delivery to CERN. All five units have been assembled.

The diffusion pumps and their accessories have been delivered.

The warm pump-out units are complete apart from the front panel.

6. MECHANICAL HANDLING

The chamber trolley has been delivered to RL and installed satisfactorily on the rails.

All major handling equipment has been designed and ordered.

7. ACCESSORIES FOR CONTROL AND MONITORING

A number of control panels have been completed and five have already been delivered to CERN.

8. IRON STRUCTURE

Nothing to report.

9. TRANSPORT TO CERN

Nothing to report.

10. PROGRAMME

The latest programme, valid on 1st September 1979 is attached. Points to note are as follows:

10.1 The delayed delivery of the chamber to RL, which despite a revision of the assembly and test programme at RL will result in a delivery to CERN at the end of April.

10.2 The completion of all sub-assemblies associated with the chamber before the end of 1979 allowing effort to be concentrated on the chamber assembly in 1980.

10.3 A revised schedule for the window gaskets.

10.4 Small delays in the completion of the vacuum tank.

10.5 Maintenance of the lens delivery programme.

11. FINANCIAL

11.1 A financial statement valid at 31 August 1979 is attached.

Points to note are as follows:

11.1.1 The commitment has reached £ 830,705

11.1.2 The latest revised estimate including items being worked on by CERN personnel is 13% more than the original estimate after correction for inflation.

11.1.3 The inflation correction factor is shown in Figure 1.

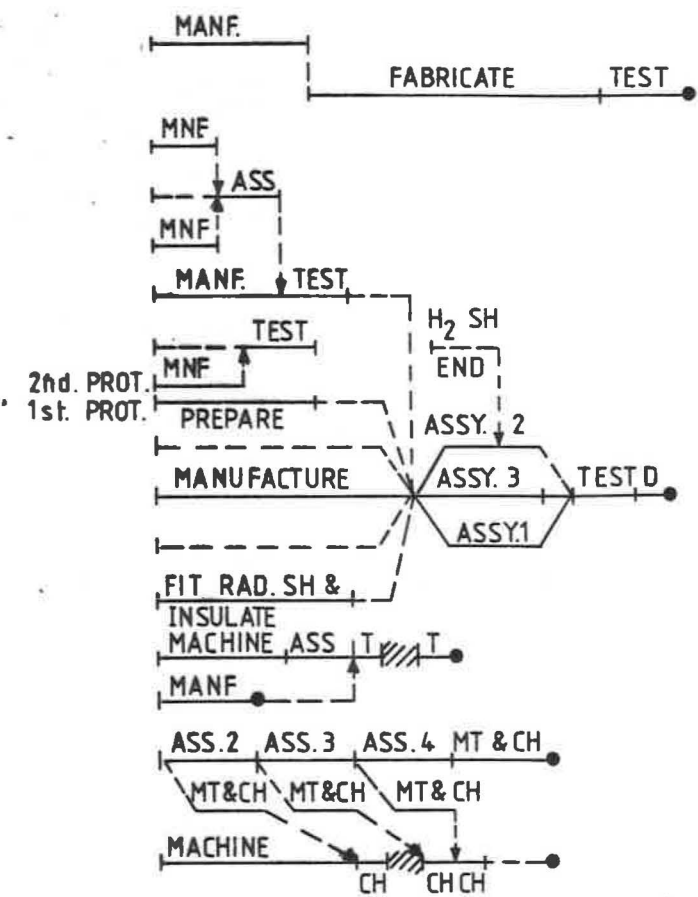
13th September 1979

Rutherford Laboratory.

27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42

WINDOW GASKET
 CHAMBER WINDOW
 PISTON-BELLOWS ASSEMBLY
 CHAMBER
 VALVE VESSEL
 VACUUM ENCLOSURE
 LENS SYSTEM

SPINNINGS
 ASSEMBLY
 DUMMY WINDOW
 FLANGE
 TEST RIG
 TEST RIG
 ASSEMBLIES
 TROLLEY
 ASSEMBLY
 SUPPORT
 ASSEMBLY
 OPTICS END
 ASSEMBLY
 LENSES
 SUB-MTS
 L. PLATE



● DELIVER TO CERN

1979 1980
 RCBC PROGRAMME 1 SEPT 1979

FINANCIAL STATEMENT
 RAPID CYCLING BUBBLE CHAMBER FOR EHS CERN
 PROJECT NOs NA71500 - NA71799 INCLUSIVE
 PROGRESS STATEMENT AS AT 1 SEPTEMBER 1979

ITEM	INITIAL COST ESTIMATE 15.2.77	LATEST COST ESTIMATE * 31.5.79	COMMITTED TO 31.8.79	FORECAST DELIVERY DATE	TOTAL SPEND IN PRIOR YEARS	ACTUAL SPEND IN CURRENT YEAR TO 31.7.79	SPEND FORECAST 1979/80
	£	£	£		£	£	£
1. Chamber & Vac Enclosure	297,235	313,096	371,188	30.4.80	128,165	32,961	—
2. Optical System	86,925	93,468	89,792	28.2.80	8,060 ^C	8,921	—
3. Chamber Temp Control	46,640	46,640	47,353	30.4.80	31,464	5,844	—
4. Expansion System	58,488	64,071	66,573	31.12.79	49 ^C	—	—
5. Vacuum Systems	36,559	53,000	64,008	30.11.79	44,004	5,704	—
6. Acc for Control etc	17,798	17,798	11,998	31.12.79	3,927	664	—
7. Mech Handling Equipt	29,120	30,920	36,028	30.4.80	6,031 ^C	1,731	—
8. Iron Support Structure	78,000	118,956	135,639 ⁺	DELIVERED	137,094	—	—
9. Transport to CERN	18,200	18,200	7,734	—	7,734	99	—
10. Miscellaneous	1,040	1,040	—	31.12.79	—	—	—
	670,000	757,189	830,705	—	366,528 ^C	55,924	300,000

+ £ 9,500 will be paid from another CERN budget

Contract Price £670,000 (+ 15% Contingency) at 15.2.77 prices.

^C Not including payments by CERN

* at 15.2.77 prices.

All prices exclude VAT.

PRICE CORRECTION FOR INFLATION

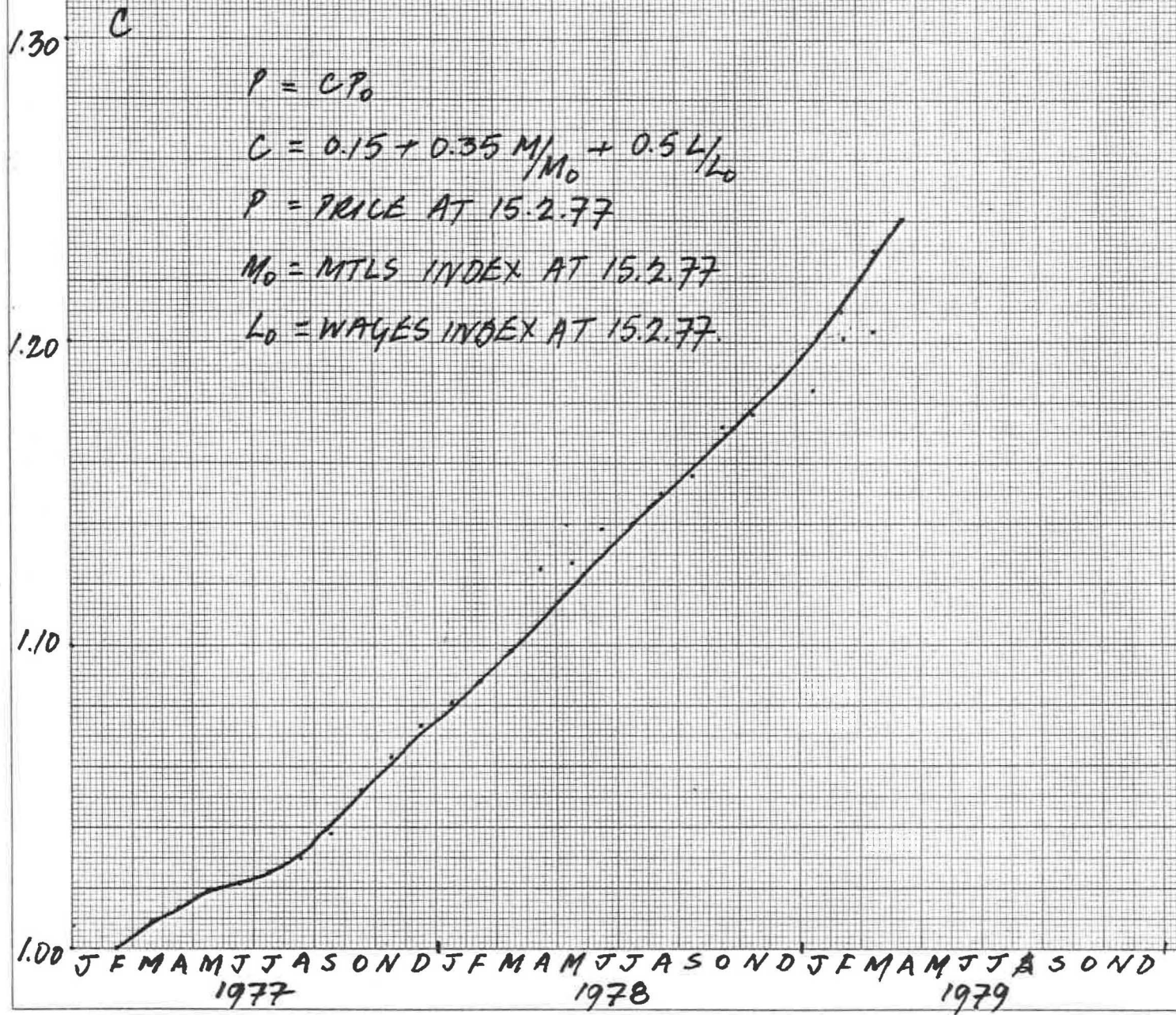


FIGURE 1.