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THE USE OF THE WEST HALL SWITCHYARD FOR EXPERIMENTAL PHYSICS

The question was asked, what is the earliest date we could imagine starting to use the switchyard only for a Muon experiment together with say two other electronic experiments. The answer to this, ~~with the reasons and reservations given below~~, is the beginning of 1970 but with strong reservations connected with budget, available staff & the priorities to be given to different MPS commitments.

Comments

1. Beam transfer from P.S. to Switchyard

See memo of P. Germain to D.G. of 22.4.1966 headed "Switchyard". The earliest possible date is given as mid-1969. K. Johnsen has recently said that they are still working to maintain this date despite the fact that the work load for B. de Raad and his collaborators is almost unbearable. C. Zilverschoon mentioned that the water supply for the beam transport will not be available before September 1969.

One can conclude that the transfer system could be working at the end of 1969, beginning of 1970.

C. Johnsen mentioned a potential budget difficulty about which the D.G. was verbally informed in June 1966.

2. Ejection from s.s. 16 to West Hall and I.S.R.

It is assumed that slow ejection will be needed first for counter experiments and will be given priority over fast, but taking it into account (I.S.R. will need fast ejection for tests during 1971). The M.P.S.

(A. Ašner et al.) have recently started theoretical work on the problem assuming the largest possible beam size due to the addition of a booster to the P.S. Thus a completely new septum magnet must be designed along with other ejection accessories. The slow ejection power supply (the equivalent of the Schneider Westinghouse) will be designed after model studies which will be made in the course of 1967.

The best time estimate that can now be made for starting up this slow ejection system is the second half of 1969.

3. Equipment for experimental facilities

These items must include :

a) Beam transport for :

   1. Ejected beam
   2. Secondary beams
   3. Any electrostatic separators required

b) Power supplies for items (a) and any large magnets

c) A.C./D.C. distribution systems and sub-stations

d) Water cooling to match power dissipated and a distribution system.

e) Shielding

f) Miscellaneous, e.g. :
   targets, security, communications, control room equipment, provision of necessary signals to groups, etc.

It is assumed after talking with some M.P.S. Group Leaders and others that for most of this work two years is required to get from a roughed out specification to having the items operational; this after some time for preliminary thinking and discussion.

Thus if during 1967 the preliminary thinking were taking place inside the M.P.S. Division and at the end of that year or the beginning of 1968 the concentrated work started, we could expect to have the experimental area facilities available by end 1969, beginning 1970. This remark must be

be subject to an important reservation : the groups involved with this work are committed during 1967 not only to P.S. improvement (e.g. improvement of the existing ejection schemes and designing new ones, commissioning of new power supplies etc.) but they are involved in active studies for the booster. The technical help available is in some cases barely adequate for the work in hand and would be insufficient to take on any extra load such as the West Area. Thus new posts would need to be provided and these in the course of 1967. A most tentative estimate of the number is the order of five but this must be looked at in some detail, together with and overall plan; in addition further recruitment would have to take place in 1968 (say tentatively 3-5) and 1969 (about 17).

Also 1968's staff budget if it were agreed that they were filled before the end of 1967.

4. Budget

Document CERN/FC/892, page 47, A "Improvement Programmes", item 6 - I.S.R. Hall for 25 GeV physics (first part of equipment) shows the total available money (initial estimate at 1965 prices) to be 10 MFr. allocating to 1969 5 MFR. and 1970 5 MFr. and zero for 1971.

If one is to follow the method given under (3), the the monies would need to be redistributed. The exact amounts could only come out of a detailed plan but, again, tentatively it is thought to be about the following :

1968	1969	1970	
1.5 2.5	5.5 - 5	3 - 2.5	M.SFr. 10.-

The total of 10 M.Fr. will not allow extensive experimental facilities, moreover Ch. Peyrou says he hopes to be testing the 3.5 H.B.C. during the course of 1971. Even if this date slips to 1972, I assume that a first beam will be required by that time. Thus the present budget of 10 MFr. would have to extend to electronic and first bubble chamber facilities. Just to have some orders of magnitude in mind we recall the following : the present two R.F. cavity version of u_3 require over 2 MFr. (1966 prices) for beam transport without counting power supplies, water and R.F. cavities. Also excluded are ejected beam transport and shielding; the South Hall d beam transport alone costs 0.8 MFr.

5. The Switchyard - Roof ? The West Hall

As now planned the switchyard is without roof. It seems difficult enough to conceive the switchyard as a switchyard without cover but it becomes almost impossible when used as an experimental hall. Subsidiary non-trivial costs will be involved for covering apparatus, temporary buildings, etc. although these should not be a large fraction of the 4 MFr. necessary for the roof. If there were a decision taken to cover the switchyard by end 1967, ~~beginning 1968,~~ A. Bianchi thinks the roof would be complete ~~by about~~ in the course of ~~April~~ 1969. However, should a decision be taken after the building work is finished (contract date for finishing civil engineering work 1st Nov. 1968) then about a year would elapse before the work could be terminated. Of this about six months would be needed for the civil engineering work. A. Bianchi gives as opinion that it would be almost impossible to use the switchyard and roof it at the same time.

Some estimations given by C. Zilverschoon on dates of freeing the West Hall are : about half empty, mid 1970, completely empty end 1970. In this context we should ask I.S.R. to plan the hall space utilisation so that half empty is not just half the area and cannot therefore be used for experimental purposes.

6. Conclusions

With a most serious effort both in parts of I.S.R. and M.P.S. it is possible to imagine that the switchyard could be operational at the beginning of 1970. This represents a compression of about 3/4 year on first tentative plan made in M.P.S. in June 1966.

M.P.S. would need more or less immediately (in view of the difficulty and therefore time taken for recruitment) extra vacancies. At this moment the needs of much of the 1968 physics programme are unknown and should we find that extra equipment has to be supplied for 1968, this too will represent a load which probably cannot be efficiently (in terms of time) carried out by <u>some</u> of the groups. Thus, as far as M.P.S. is concerned, one must review all the work - P.S. operation and minor improvements, Booster, West Hall, Serpukov as a whole to make sure that there is a proper match in time scale and personnel. Can anything be allowed to slip ?

at least

The existing budget allocations need to be modified to extend the money over three rather than two years but. In addition the total quantity could well be insufficient.

7. Proposals

a) A detailed time table could be prepared taking into account all present committments and likely ones from the 1968/69 programmes. Staff increases can be evaluated for the fast time table we have suggested (e.g. beginning 1970).

b) Budget

A fist estimate for a budget could be made assuming say three electronic experiments, one of which is to be the "muon" and one bubble chamber beam. On this point some guidance as to the ambitions or wishes of the groups would be necessary.

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