two instead of three

3. In Figure (5). it is not clear how a moment x3 can have value since the frame is tunged there. Hence this diagram needs to be reviied.
4. Considering &he frame in Figure (8-a). and the necessary equation (3) in page (c-51O). equations a.b,c, do not give the values d. x2. and x3 given below. It seems they need to be revised. As a matter of fact. as already stated after that. two equations of compatibility are sufficient to get the answer but not as suggested.
5. In Figures (II) and (12), iD example (3), the presence of x3. the value of which is given as 3.272 is not understood. since it doesnt uppear in Figure (13). This is supposed to be a hinged support.

Finely, it is seen that the methods of analysis given so far. necessitate the solution by column analogy of many cells due to he given loads, and to the redundant forces or moments needed in the solution. Besides we have to calculates the relative movements at the ends of spliced members due to the acting external forces and the redundant. This last part will be rather difficult, especially for the case of hinged ends for the spliced members. It is then required to make and solve so many equations of continuity at the common joints. This was why, the presence of computers made it possible to deal with the structures in a much simpler way, with no difficulty in preparing and solving as many equations as necessary.

Sometime ago, the writer developed a method of analysis based on the stiffness method, in which reduced stiffness factors. represented by linear functions were used. The program thus adopted was called (SOISP). This is shown in Appendix (1). and its data program in Appendix (2) for the solution of the continuous three cell structure in Figure (1), call the "OATAD" program of appendix (2), and fill in the necessary "OATADl" , now, give the order (MERGE ·SDISO"" • and (RUN) to get the final result .

Discussion 0r the paper:

ANALYSIS OF MULTY -CELL STRUCTlJRES BY mE COLUMN ANAWGY METIIOD

Mohammad T.H. EIKatt·

Discussion by

A.F.S. Diwan

Structural Engineering Department Faculty of Engineering.

Alexandria University. Alexandria. Egypt.

In an excellent paper. the author presented the solution of multy-cell structures using the method of column analogy. He referred to the previous work in this field made by I). Diwan, A. Fahmi published 1922. and that presented by M. Badir in 1990. In the first work. the author were concerned with two cell structures, using a method called "Extended Column Analogy", the aim of which was to reduce the unknowns to three unknowns only, since a structure with one cell was taken instead of a statically determinate system. In the second work. the author divided the multi-cell structure into its components of unit cells with the common members divided into two halves each for the cell on both. sides. This is in fact an excellent solution since it given as many condition of continuity as two multiplied by the number of common members. In the first work. considering the three cell structure in Figure (2). it is necessary to solve six equations, that is (9-3) = 6, where as in the second idea given by M. Badir, only four equations are needed. namely (2x2) = 4. Notice, the time lapse by the given two references, namely 1972. and 1990. Still. it was assumed in the solution given by Badir, that the commen member are unloaded. other wise the method will not give correct results.

Now, the given paper by M.Elkattgives the correct answer to this problem when the common members between the cells are loaded. It suggests that the acting loads should also be divided between the two halves.

The following remarks are noticed.

1. For sliced members, the necessary equations are twice the number of these members. but not one equation of top and the other at bottoms it is stated there. In fact the two equations are needed at top to maintain continuity in the sliced member. Figure (2-b) needs then to be revised.
2. In Figure (4.a), (4-b) the only possible movement at joint 0 will be normal to member (1-2) if axial deformation is dis-regarded. This reduces the number of unknowns to