

EXAMPLE 2(B): METHOD: MAXWELL DIAGRAM WITH BOW'S NOTATION

GIVEN: The same symmetrical truss, drawn to scale, with asymmetrical loads, used in the preceding method of joints example, *Figure 8-79A*. Label the triangular spaces within the truss with numbers. Draw a light line envelope surrounding the truss and passing through each applied force and reaction. Label these spaces with letters.

STEP 1 Start a force diagram (to a scale to keep the diagram on the drawing sheet) by reading the external spaces in a clockwise direction, a to

b, b to c, c to d, d to e, and e to a. Plot each applied force and reaction, *Figure 8-79B*.

Either clockwise or counterclockwise will work, but once a pattern is started it must be used throughout the complete problem both for the Maxwell diagram and for determining whether a member is in tension or compression.

STEP 2 Start at a joint with only two unknowns, A or D. At joint D, go clockwise a to 1, 1 to e, and e to a to locate point 1, *Figure 8-79C*.

STEP 3 Now joint E has only two unknowns, so continue d to e, e to 1, 1 to 2, and 2 to d to locate point 2, *Figure 8-79D*.

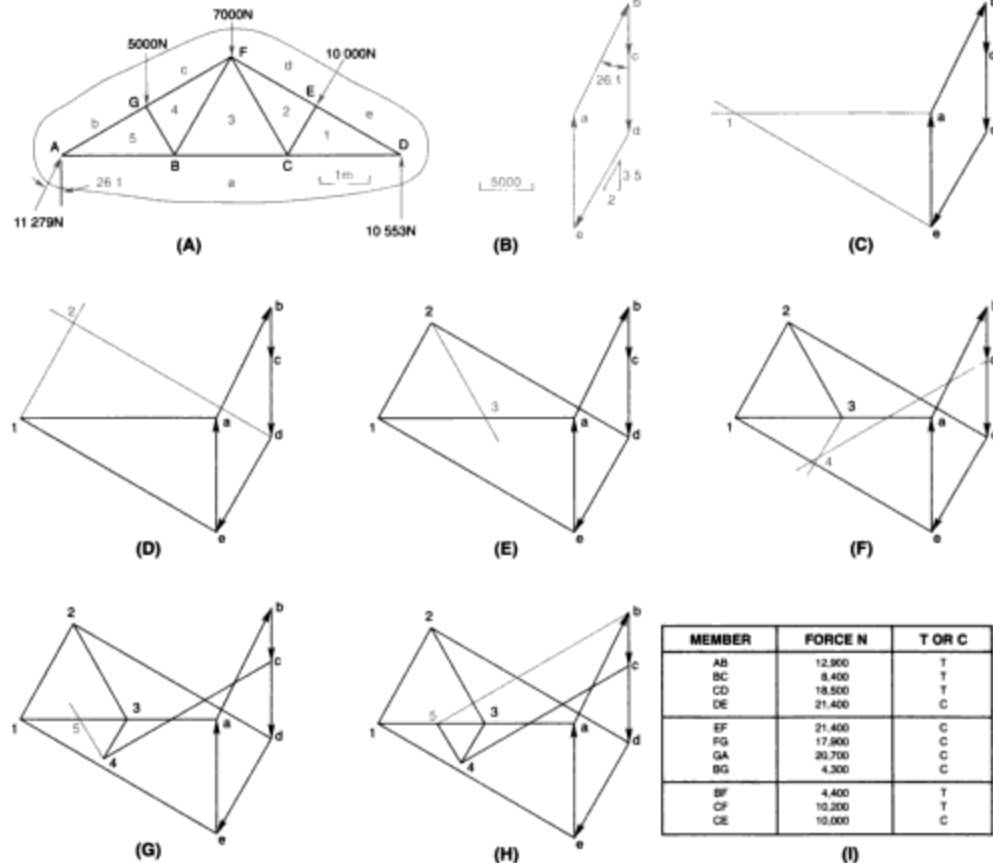


FIGURE 8-79

(A) Example 2 (b) Maxwell diagram with Bow's notation; (B) Step 1; (C) Step 2; (D) Step 3; (E) Step 4; (F) Step 5; (G) Step 6; (H) Step 7; (I) Step 8

From
Technical Drawing
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STEP 2 Start at a joint with only two unknowns, A or D. At joint D, go clockwise a to 1, 1 to e, and e to a to locate point 1, *Figure 8-79C*.

STEP 3 Now joint E has only two unknowns, so continue d to e, e to 1, 1 to 2, and 2 to d to locate point 2, *Figure 8-79D*.

STEP 4 For joint C go a-3-2-1-a to locate point 3, *Figure 8-79E*.

STEP 5 Joint F has only two unknowns, so go d-2-3-4-c-d to locate point 4, *Figure 8-79F*.

STEP 6 Around point B go a-5-4-3-a to locate point 5, *Figure 8-79G*.

STEP 7 For the last joint, A, go a-b-5-a, *Figure 8-79H*. The closing line in direction 5-b should intersect point b on the Maxwell diagram for a correct solution.

STEP 8 Prepare a table of the forces in each member; scale the diagram for magnitudes and use the clockwise pattern to determine whether the force goes into the joint (compression) or goes away (tension), *Figure 8-79I*. For exam-

ple, around joint C for member CF; 3-2 goes away from the joint; thus, CF is in tension. Scale the magnitude to be 10,000 N. Around joint F; 2-3 goes away from the joint F as expected because CF is a tension member.

Assignment

Use the Maxwell diagram method to determine the reaction forces and the forces in all members.

