



US005757675A

United States Patent [19]

[11] Patent Number: 5,757,675

O'Brien, Jr.

[45] Date of Patent: May 26, 1998

[54] **WORKPLACE LAYOUT METHOD USING CONVEX POLYGON ENVELOPE**

Primary Examiner—James P. Trammell

Assistant Examiner—Patrick Assouad

[75] Inventor: Francis J. O'Brien, Jr., Newport, R.I.

Attorney, Agent, or Firm—Michael J. McGowan; Robert W. Gauthier; Prithvi C. Lall

[73] Assignee: The United States of America as represented by the Secretary of the Navy, Washington, D.C.

[57] **ABSTRACT**

[21] Appl. No.: 708,008

An improved method for laying out a workspace using the prior art crowding index, PDI, where the average interpoint distance between the personnel and/or equipment to be laid out, \bar{d}_{acr} , can be determined. The improvement lies in using the convex hull area, A_{poly} , of the distribution of points being laid out within the workplace space to calculate the actual crowding index for the workspace. The convex hull area is that area having a boundary line connecting pairs of points being laid out such that no line connecting any pair of points crosses the boundary line. The calculation of the convex hull area is illustrated using Pick's theorem with additional methods using the Surveyor's Area formula and Hero's formula also being described for calculating A_{poly} . The improved crowding index is termed PDI_{poly} to distinguish it from the prior art crowding index, PDI_{acr} .

[22] Filed: Aug. 27, 1996

[51] Int. Cl.⁶ G06F 15/00

[52] U.S. Cl. 364/564; 705/7; 705/8; 364/512

[58] Field of Search 364/564, 400, 364/401, 402, 512; 705/7, 8

[56] **References Cited**

U.S. PATENT DOCUMENTS

- 5,235,506 8/1993 O'Brien, Jr. 364/400
- 5,402,335 3/1995 O'Brien 364/401

OTHER PUBLICATIONS

Chang et al., "Dynamic Algorithms in Computational Geometry". IEEE, Sep. 1992.

10 Claims, 1 Drawing Sheet

