

# Modular system replaces custom fixtures

**F**or economic and precise positioning, clamping, tacking and welding of multipiece components, the modular, three-dimensional, Demmeler fixturing system can be indispensable. Besides obviating costly custom fixtures, it provides 3D coordination of key elements at various locations

## System elements

There are two systems: the D 16 and D 28, each with a worktable featuring a precision grid pattern of bores on top and side machined surfaces for positioning and clamping connecting elements for assembly components. The D 16 table has a 50 x 50-



Fanning out, and up 14 ft to 8x8-ft frame, 0.625-in. stainless-steel rods from 6 x 42-in. base form structure of aesthetic light stanchions. Developed by Product & Design using the Demmeler modular fixturing system, they line the way at the Staten Island ferry terminal.

in space for welding on or off the system. This indeed has been the principal benefit at Product & Design, a Brooklyn Navy Yard, NY, job shop, says John Milich, president. Produced by Demmeler Maschinenbau of Germany and distributed by Bluco Corp



D28 Demmeler system features worktable up to 1500 x 3000 mm with bores in 100 x 100-mm grid pattern. On display are various system components, including angles and clamping devices for positioning assembly workpieces.

(Naperville, 111), the system consists of a sturdy 3D worktable, flat and square to 0.0004 in/ft; versatile connecting elements and clamping tools; and an easily applied clamping bolt.

mm grid of 16-mm bores and comes in three sizes: 500 x 1000, 1000 x 1000, and 1000 x 2000 mm. For the D 28, it's a 100 x 100-mm grid of 28-mm bores in table sizes of 1000 x



PC bolt joins all system elements to worktable. Just insert and turn head to extend balls in shank and provide 5-ton clamping force, 25-ton shear force. O-ring keeps bolt from turning during tightening, permitting one-hand operation.

1000, 1000 x 2000, 1200 x 2400 and 1500 x 3000 mm. Table legs, four or six, respectively, are individually adjustable up to 50 mm.

Connecting elements, with bores matching



Manifold and pipe flanges for welding

table bores for attachment in various arrangements, are displayed on the D 28 table (photo). They include two- and three-sided angles with adjustable position location. An L-shaped spacer, usable on four sides, can serve as a table extension and clamping surface, worktable connector for several tables, or as a connector for other system components. There's also a U-shaped spacer, with five usable sides, for similar applications. Other elements include



Connected worktables support machine-gantry frame section during welding

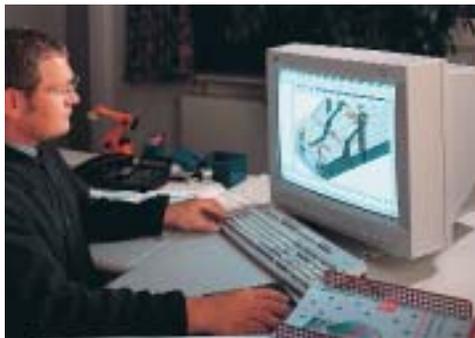
an adjustable universal stop for attachment on 45°, 90°, 135°, and 180° angles; adjustable (up to 225°) universal clamping and locating angle; and a corner module for diagonal table extension, V-block support and locator, and corner locator for other components.

All of these elements can be joined to the table to suit assembly requirements with a novel positioning and clamping (PC) bolt. With a simple turn of the head, four balls in the shank extend to join elements to the worktable with 5-ton locking force and 25-ton shear force. A fitted O-ring seal prevents element rotation when tightening the bolt while simultaneously cleaning the bore of dirt and welding spatter. There's also a variety of adjustable swing and angle clamps for workpiece clamping.

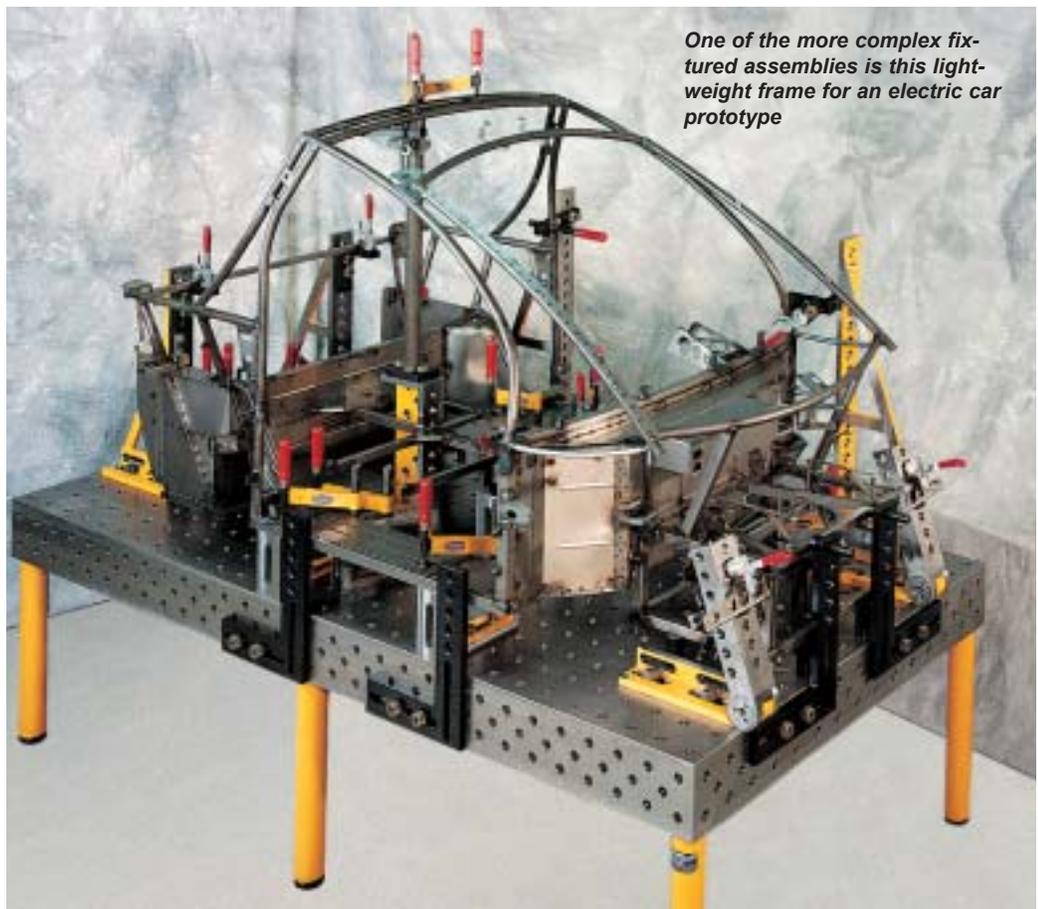
With this system of positioning and clamping in any horizontal or vertical plane, custom welding fixtures are no longer required. Eliminating eight to ten fixtures typically pays for the system. For repeat jobs, drawings can be made using the coordinates of the grid pattern and system elements needed, or a photo can be taken of the system. And, using CAD, a virtual fixture of the system and assembly can be easily created. To ease maintenance, a daily light coating of antispatting compound will keep the table insensitive to dirt, scale and spatter.

#### Ideal for complex products

For Product & Design, which does \$1 to \$2 million in annual revenue, a 1000 x 2000-mm system has been in almost daily use since it was acquired in 1995 for about \$35,000. According to Milich, it's a 3D coordinate system, permitting conversion of drawing plan views at various elevations into final product assemblies. It provides very accurate 3D rectangular geometries of required products by creation of multiple planes from the table surface. Accurate layups can include flat-pattern layouts with bend lines for subsequent forming operations.



CAD ensures repeatability of fixture design for instant recall



One of the more complex fixtured assemblies is this light-weight frame for an electric car prototype

Welding, typically GMAW or GTAW, and other joining methods are performed on or off the worktable, depending on product size. Subassemblies may be welded, brazed, bonded or mechanically fastened on the table and the final assembly made off the table. Common construction materials include steels, stainless steels and aluminum alloys.

One of the latest products is a 9 x 16-ft, stainless-faced aluminum honeycomb laboratory table sink and air-duct regions. Other applications include display cases, 10-ft-tall aluminum circular staircase and a 1 0-ft-tall stainless-steel elliptical staircase.



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BLUCO CORPORATION • 509 Weston Ridge Drive • Naperville, IL 60563  
 (630) 637-1820 • 800-535-0135 • Fax: (630) 637-1847  
 www.bluco.com • info@bluco.com