EVO7

EVALUATION

EVO7 Ergonomic Evaluation Executive Summary

The patented TLC technology found in the EVO7 has been built into the EVO9 tools. Although this study focuses on EVO7, the performance results and ergonomic benefits will be consistent for all EVO tools.

The Center for Ergonomics at University of Wisconsin – Milwaukee conducted an ergonomic evaluation of mechanical cable tie hand tools. HellermannTyton's EVO7 (Tool C) was compared against Panduit's GS2B (Tool A) and GTS (Tool B), and Thomas & Betts ERG50 (Tool D). The study consisted of 576 experiments, employing 24 subjects (12 male and 12 female), four mechanical hand tools, and three different tensile strength cable ties (18 lb., 30 lb., 50 lb.).

Objective measurements, subjective measurements and user feedback were collected for each tool. The primary objectives were to determine:

1. Amount of grip force applied during tool use.
2. Level of perceived stress during tool use.
3. How comfortable each tool was to use.
4. Amount of kickback during tool use.
5. Ease of applying cable ties using each tool.
6. Ease of tension setting.
7. If the tools "pinch" the hand during use and, if so, how frequently and how severely.

The key findings are:

- Applied grip force requirements for using the hand tools ranged from 27.8 to 46.5 lbs. Three of the tools (A, B, D) required similar forces for each tool/tie combination. EVO7 consistently required less force that the other tools, with a maximum force difference of 10.1 lbs. (21.7%) less force when applying 50 lb. cable ties.

- Subjects rated tools using a Borg CR-10 rating of perceived exertion scale using values of 1-10 (1 being "very light" and 10 being "max effort"). Tools A, B, and D received ratings between 1.6-5.6, while EVO7 received relatively lower ratings between 1.2-2.9. EVO7 was the only tool to be rated below 3 on a consistent basis, which is perceived as requiring less than "moderate" effort to use for all cable tie combinations.

- Handle design, kickback, and grip effort required to use the tool have a strong effect on tool comfort. The tools with rounded handle designs (EVO7, B, D) were all rated as comfortable, while the tools with the squared handle design (A) was rated as uncomfortable for stronger ties. EVO7 was rated as most comfortable; possibly due to its consistently lighter grip force requirements, lack of hand pinching, and minimal kickback during use.

- Subjects rated the ease of tension setting using a scale of 1-7 (1 being very difficult and 7 being very easy). EVO7 performed very well, with practically perfect ratings. EVO7 has a precision adjustment mechanism (in addition to its discrete setting dial) that allows the tool to be precisely calibrated. Because EVO7 has discrete tension settings (33 in total), tension can be easily changed during use without disturbing calibration. Thus, EVO7 would be the best choice for work environments where tensions are frequently changed, and greater tension precisions are required.

- When asked to rank-order the four tools based on: (1) overall preference, (2) overall comfort, (3) ease of setting tension, and (4) overall ease of tool use, subjects consistently ranked EVO7 as best.

- When evaluated using the Strain Index (Moore and Garg 1995) and the force estimates determined in this study, EVO7 resulted in more "low risk" working scenarios than the other three hand tools tested. This suggests that use of EVO7 (as opposed to the other tools tested in this study) can help to reduce the risk of hand/wrist musculoskeletal injuries in industry.

HellermannTyton