Simulating Industrial Reach Motions for Biomechanical Analyses

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Many manufacturing workstations, service centers, and offices require frequent reaching motions. We have constructed a model of these motions with a seven link system (pelvis, torso, neck-head, shoulder, arm, forearm, and hand) with 19 degrees of freedom. A new functional regression method has been utilized to predict the kinematic behavior of the subjects, and to test the effects on the movements due to: Anthropometry, gender, age, reach end-point locations, and weight being moved.

The resulting motion predictions can be combined with popular human CAD packages, e.g. 3DSSPP, EAI-Transom Jack, to visualize normal human motions. In addition, biomechanical models of population muscle strengths, as well as low-back and shoulder joint forces, are being utilized to evaluate the sequential postures predicted by the motion simulation model.

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