Aligned Parts Assembly System

Reflections and Comments by A. Brent Strong, Lorin Farr Professor of Entrepreneurial Technology at Brigham Young University

Because parts of various sizes and shapes can be molded to near finished-shape dimensions, injection molding is, by far, the dominant plastic molding process. As plastics continue to expand in their applications, injection molding will also continue to expand. In spite of this favorable outlook, injection molding has a major deficiency—the need to manipulate each injection molded part prior to subsequent steps in the manufacturing process. This deficiency is especially apparent when the molded parts are used in subsequent assemblies. With the Aligned Parts Assembly System (APAS), this deficiency is eliminated. The result is that efficiencies of injection molding facilities will dramatically increase. The potential benefit, because of the dominant role of injection molding in plastics manufacturing in the United States, could be enormous for American manufacturing.

The normal pattern in injection molding operations is for the parts to be ejected by the machine and to fall randomly into a bin. The parts are then manipulated to sort them and orient them. Even when a robot is used to extract the part from the machine, the robot usually drops the part on a conveyor belt which feeds into a bin, thus resulting in the same randomness as the normal ejection system.

The Aligned Parts Assembly System has the potential to revolutionize assembly operations in which injection molded parts are used. APAS uses the same logical concept that was invented many years ago to improve efficiencies in the electronics industry. That concept is the use of belts to carry and dispense parts into a subsequent assembly operation. This is the same idea used to feed bullets into machine guns. Ford's assembly line was another method of delivering parts to the right place at the right time for subsequent operations.

APAS captures and retains the natural alignment and orientation of the part as it is molded. No special orientation or manipulation operation (manual or robotic) is needed. APAS is natural and simple. Parts are simply captured by a moving belt as they are molded and then transported to the next assembly operation where the belt feeds the parts reliably and efficiently.

While my expertise is chiefly in plastics manufacturing, such as injection molding, I also see the potential for the APAS system in multiple other manufacturing operations where part orientation is lost by the random processes that are usually employed in post-forming operations. Such molding processes include powdered metal molding, metal casting, metal stamping, metal drawing, and metal forming. Clearly the potential applications for APAS are widespread.

The fundamental beauty of the idea of APAS is simply this: **control the part throughout the manufacturing process**. There is no reason to allow the part to become randomized in orientation and alignment and then, in a subsequent step, re-orient and re-align the part. Logic and intuition tell us that the second orientation is wasted time and expense. America cannot afford to waste the money and time associated with these unnecessary manufacturing steps. Our competitiveness depends on using our creative capabilities to improve manufacturing. The Aligned Parts Assembly System is one of those creative innovations, like Ford's assembly line, that can significantly improve the manufacturing advantage of the United States.

4/6/2009