Hoyt Lecture: Cast Materials Can Lead Humanity Into the Future

Metacasting can help humans to boldly go where no man has gone before, according to David Weiss’s Hoyt memorial lecture at the 113th Metalcasting Congress.

Weiss, Eck Industries, Manitowoc, Wis., said during the annual keynote speech that “the progress of civilizations has been propped by the development of materials and ways to manufacture them,” citing the historical discoveries of copper and cast iron as examples. If we are to advance as a civilization, according to Weiss, we must continue to make significant developments in materials science.

In his presentation “Foundries: The Final Frontier—the Next Thousand Years of Casting Technology,” Weiss suggested a number of unique materials that might exist in our future. Some of the metals (e.g., interon, which violates all known laws of physics) were drawn from science fiction novels and movies; others, he said, would be attainable with reasonable scientific study and improvement in the metacasting process in particular.

According to Weiss, when titanium was difficult to obtain and process, many considered the metal to be the ultimate material, with an otherworldly ability to solve any design challenge. In the same way that titanium has now become commonplace in many applications, Weiss encouraged metacasters to strive toward materials development in the future.

The industry must focus on four things in order to make it happen:
1. Obtaining additional financial support from the government.
2. Adopting an attitude in metacasting facilities that inclusions in metal must be eliminated and metal density can be improved beyond the existing 95% standard.
3. Researching ways in which to improve casting simulations, including the development of simulators that can examine the gas generated from mold/metal interactions.
4. Recognizing and acting on the importance of composite metal materials.

Weiss concluded his presentation by urging the industry to pursue an “X Prize” for the development of improved cast materials. According to the X Prize Foundation, an X Prize is an award given to the first individual or team to achieve a specific goal, set by the foundation. The foundation, which takes suggestions from the public, attempts to identify goals that “have potential to benefit humanity.” Weiss has confidence that cast materials can do just that.

Silver Anniversary Papers

Two authors delivered lectures based on their Silver Anniversary papers at the 113th Metalcasting Congress.

Victor LaFay, S&B Industrial Minerals N.A. Inc., Cincinnati, spoke on behalf of the Molding Methods and Materials Div. in his paper entitled “Mechanism, Control and Application of Self-Setting Sodium Silicate Sand Systems.” Sodium silicate binder technology, now more than 20 years old, has changed considerably over the years, and LaFay reviewed the various updates that have been made over time in order to keep the molding material up to speed with the environmental regulations of the day. LaFay concluded that the binder systems have achieved higher tensile and compression strength properties while reducing emission characteristics when compared to organic binder systems.

John Joostad, JJF Technologies Inc., South Hill Va., offered the Aluminum Div. Silver Anniversary paper, “Progress of 350 Alloy: From Inception Until Now.” This hypereutectic alloy became popular in the mid-century for engine cylinder blocks and has remained so due to its wear resistance, low thermal expansion and good elevated temperature service. It has seen other applications through the years, and Joostad said that while the alloy may be phased out of engine production over time, its desirable characteristics may keep it in the mix for some non-engine components.

New AFS President Stephen Reynolds hands David Weiss an award for the honorary lecture.