

TECHNICAL PAPER PRESENTATION 2nd day PROGRAM

9:30am-4:40pm Friday, November 7

Giving lectures in Japanese ●Presenter **TIME SCHEDULE P.6**

(1) 9:30am-11:50am

Session Chairperson: Syunzo AOYAMA (Dr.Eng.), Ahresty Corporation

JD08-13

Increased Overall Equipment Efficiency (OEE) with innovative equipment and process technology

The Japan Steel Works, Ltd. ● Takeshi YAMAGUCHI, Kazuya TSUJI, Hiroshi KAJIKAWA

B?hler Druckguss AG

Leo Ito

With a number of new concepts, B?hler can assist foundries in significantly increasing their productivity while at the same time and as a corollary benefit reducing their overall manufacturing costs. Several B?hler process technologies that improve Overall Equipment Efficiency (OEE) will be described in detail in this paper. Carat two-platen clamp-end technology is a demonstrated casting quality optimizer incorporating a more rigid and robust clamp-end: The main benefits are more uptime and less scrap. Low Temperature Casting (LTC) is a process to reduce metal casting temperature and thereby reducing the heat to be removed in the die: The main benefits are less flash and increased die lifetime. Lastly SPEEDiall, is a special system/process allowing metal to be inserted into the shot sleeve before the die is closed: The main benefit is the reduced cycle time. Examples and case studies of these technologies will also be described.

JD08-14

The activities for stable and certain reproducible production in the high-pressure die casting process

Toyota Motor Corporation Casting Engineering Dept. Fundamental Production Engineering Div. No.1

● Takashi HIRAI, Nobuhide KONDO, Yukio FUKUTA

The world car market is growing up steadily, and globalization of production plants is advanced. We produce castings for engines and transmissions by the high-pressure die casting process. For the simultaneous production with the same quality all over the world, it is important that high-pressure die casting machines and auxiliary equipments can reproduce production conditions with stability and reproducibility under any kind of environment. The high production efficiency is only one of the necessary conditions. On the basis of the results of our investigation of the existing equipments from this point of view, we will explain the essential requirements for the simultaneous production with the same quality of the high-pressure die casting process.

JD08-15

Development of electric servomotor-driven compact-high-pressure die casting machine

Tmis Corp

ieSol Corp

Kagawa Diecast Industry INC

Hyogo Prefectural Institute of Technology

● Takashi IKEDA

Itsuo OHNAKA (Dr. Eng.)

Masahiko KAGAWA

Shigeo KASHIWAI (Dr. Eng.)

It is very difficult to economically prevent air entrapment in conventional high-pressure die-casting machines. This paper presents a newly developed compact machine that can prevent air entrapment. In this machine two plunger chips are driven with electric servo-motors, sucking molten alloy almost completely filling the plunger sleeve and eject the melt into the mold cavity with ejection pressure of less than 40 MPa. It can produce rather small parts with much less defects and with high dimensional accuracy, and is hyper-producing, space-saving and clean.

JD08-16

Effect of shot velocity and vacuum conditions on blowhole generation

UBE MACHINERY CORPORATION, LTD.

● Hiroto SASAKI (Dr. Eng.), Takashi HARADA, Norisada OE, Toshio KUROSE, Naoki ISHIBASHI, Satoru SATO

Recent tendency toward weight reduction of automobile demands larger or more complicated shaped castings, which require faster metal filling by high speed in many cases. In this study, effect of high speed filling, metal pressure and vacuum conditions for evacuating air in the die cavity on volume and shape of blowholes and microstructure around the defects are investigated by utilizing plate type test mold in various thickness of test pieces and gates.

JD08-17

The relationship of die casting machine's filling power for goodness and gating methods

Hishinuma machinery Co., Ltd.

● Motoyuki MOTOMURA,

● Hiroyuki OGAWA, Akio YAJIMA

Die castings goodness is according to filling power of die casting machine and casting method of tool type are separated two types. One type is pressure type another type is velocity type.

Lunch Time (11:50am-1:30pm)

(2) 1:30pm-3:20pm

Session Chairperson: Koichi ANZAI (Dr. Eng.), Tohoku University

JD08-18

Relation between casting conditions and the molten metal pressure in a die mold

TOYO Machinery & Metal Co., Ltd.

Shingo IKEDA,

Yoshihide MATSUMOTO,

● Masayuki MURAKAMI

Shoumei XIONG (Dr. Eng.),

Hu BO

Tsinghua University

When the metal pressure is not transmitted to the product, it causes the defect of die casting products. However when the metal pressure is too high oppositely, the decrease die life or creating the flash. Therefore, it is important that how the metal pressure in the die changes on the method of the die design, the material, and the casting condition is well informed. The casting condition and the gate thickness etc. of the die mold with different product shape and thickness are changed, and it introduces the result of measuring the metal pressure change by the pressure sensor in the die mold.



JD08-19

Moving molecular balance method for gas behavior analysis during shots

Umemura Research and Development Office

● Teruyoshi UMEMURA (Dr. Eng.)

Elementary gas dynamics gives us the number and velocity of gas molecules colliding on a unit area of wall. When it is applied to the opening of a vent of die casting we can calculate the amount of gases removed from the cavity space during shots. And when the die wall coated with lubricants we know the amount of water evaporating there. Thus the amount of gases remained in castings can be predicted. The accuracy of this "Gas Molecular Balance Method", is unknown at present, however, it is possible to know by using fundamental physical properties only how such factors as shot velocity, the size of vent valve, the degree of vacuum, the temperature of die and so are influencing on the gas inclusion in casting.

JD08-20

Effect of J-Value for internal quality of HPDC products at various casting alloys

Hitachi Metals, Ltd.

● Takao KANEUCHI, Shin-ichi SHIMASAKI, Hideharu NAKANO

Adjusting shot parameter is effective to improve internal quality of HPDC products. It is known that there is relationship between quality and metal flow condition (J-Value) at gate. We examined that the effect of J-Value for product quality on some kinds of casting alloys. The quality is evaluated by elongation of tensile testing.

JD08-21

Strength improvement of aluminum die casting

Yamaha Motor Co., Ltd.

● Toru KITSUNAI, Osamu MATSUSHITA, Atsushi HIROSE

In the die-cast parts used for structural bodies, the stable mechanical properties are important for the reliability improvements. It is known that one of the major causes to decrease the strength is the pre-solidification. Authors think that pre-solidification is minimized with higher metal and sleeve temperature, and report these effects on mechanical properties.

Blake (3:20pm-3:30pm)

(3)3:30pm-4:40pm

Session Chairperson: Kenji SATO (Dr. Eng.),
Tokyo Metropolitan Industrial Technocracy Institute

JD08-22

The effect of alloy elements on several properties, such as castability of die casting magnesium alloy

RYOBI LIMITED

Hiroyuki OMURA (Ph.D.), Tatsuki YONEMARU,

● Izumi MURASHIMA, Jo ASADA (Ph.D.),

Masahiro MATUMURA

Kyushu University

Hideharu NAKASHIMA (Dr. Eng.)

Recently, due to the demand of weight reduction for the automobile parts, several type of creep resistant magnesium alloys have been developed for the purpose of utilized for the cylinder block, the transmission case and the oil-pan and etc. We have developed creep resistant alloy in order to be utilized for the various automobile components, such as the transmission case and the crank case. This paper summarized the effect of the alloy elements on creep resistant, dumping capacities, galvanic corrosion and castability for the die castings.

JD08-23

Over view of material situation in Thailand

MINO(THAILAND) CO., LTD.

● Naomi SUGIYAMA

There are no significance differences in the result of material surveying by material manufacturer visiting during 2003-2004. However long term experience has proved that high volumes of dross occurred after flux treatment affecting factors 1. Structure of melting-holding furnace. 2. Material 3. Molten metal control. All of reasons resulted in doubt of materials itself

JD08-24

Foundry applications of Quality Engineering to improve die casting technology

HONDA R&D Co., Ltd.

● Akihiko OGASAWARA, Takashi NAGASAWA,

Kazuo NISHIO, Kunio YAGI, Tomoyuki GOTO

Parameter design of quality engineering (QE) is getting broad support through actual performance with its own systematic approach. It gives priority to inspection of variation, interaction, and function. Unfortunately, there are few reports on the die casting. Difficulty to apply its concept might stand in the way of use. Expert engineer is not always has to be QE expert. This paper and presentation discuss way of thinking on parameter design, involving comparison with one factor at a time experiment and multiway layout. Absolute beginners could find QE informative with our original MS-Excel VBA of the best practice.