Activities of Forging in Japan
September 2015-August 2016

S. Isogawa, Chairman of Forging Committee in JSTP

1. Activities of Forging Committee in JSTP

The total number of the JSTP Forging Committee members was slightly increased (145 members: 100 from companies, 45 from universities and institutes).

The following meetings were held during the period from September 2015 to August 2016 by the forging committee.

(1) Technical Meeting (October 23, 2015 in Kanazawa-city, Ishikawa)

Technical meeting entitled “The press production spot and the press utilization art which contribute to a car, part manufacturing industry” was held, and 3 lectures and technical visit to Komatsu Kanazawa Plant in Kanazawa-city were prepared for 45 attendants.

(2) Annual Seminar of forging lectures by Engineers from companies (February 3-4, 2016 in Utsunomiya-city, Tochigi)

Annual Seminar entitled “Directionality and forging technology of the automotive industry on the basis of global expansion” was held at Utsunomiya Kyowa University, 13 lectures and a technical visit to Honda Motor Company in Moka-city were prepared for 115 attendants. The fields of lectures were global expansion and strategy of the forging section in Major Car Company, company specialized in forging, steel company.

(3) Plenary Meeting and Technical Meeting (June 17, 2016 in Gifu-city, Gifu)

The 2015 Plenary meeting of Forging Committee was held at Satellite office of Gifu University with 48 participants. After Plenary Meeting, forging engineers from company were commended for his outstanding achievement in developing of forging technology. And then, 4 presentations about “Current status and future trend of Plate forging” were given. The technical visit with 52 attendants to Ogaki Seiko Co., Ltd. was carried out.

(4) Cooperation with Japan Forging Association

Japan Forging Association, JSTP forging committee and Gifu University continue the program, which develops human resources in forging industries. JSTP forging committee plays roles in making curriculum and textbook and lecture in the program.

2. Activities in JSTP, SOKEIZAI and Industry

Grand total weight of Japan forging production in 2015 was 2,145,837 tons, drastically decrease total production in 2014 and about 81% of the peak year 2007. For transport machinery, total weight of production in 2015 was 1,544,770 tons, 97% of production last year.

The large decrease in production weight is a drop of Russian currency and crude oil demand; slowdown of resource-rich nation economy, a recall started from air back problem, decreasing demand with the emission control of the agricultural machine, the prolonged slump of construction machine.

SOKEIZAI gave citation to 15 companies in 31th SOKEIZAI Industrial Technology Award
Winner ceremony in 2015 including the development of “Development of Pulse Forging which contains Low Frequency Vibration Using Servo Press” and “Development of Two-point Servo Press with Fan-shaped support rod” in the forging and related field.

The AMADA’s digital AC servo press machine is mounted with a servo motor dedicated to press machines to secure sufficient energy even during slow-speed operation. It is also capable of 9 types of motion patterns as a standard specification shown in Figure 1. With its pulse 1 motion forging that realizes non-bonderized spline bossing shown in Figure 2, reduction in processing time, improvement in product accuracy and consideration to the environment has been attained. For retreating punch, pulse 2 motions is preferable.

The other forging sample shown in Fig.3 is double involute gear by plate forging. By Pulse forging, forging operation is shorten from 9 operation to 1 shoot.

![Fig.1: Typical slide motions of Fig.2 Spline forging of S25C oil Fig.3 Double involute gear servo-press with only S agent added mineral](image)

Journal of SOKEIZAI on 2015-9 specialized “Forging technology to increase Added Value of Products”. The contents are “Example of CVJ Parts by cold Forging”, “Investigation on Non-defective Product Condition in closed Forging”, “Development of Divided Flow Type Load Reduction device Applicable for High Velocity forging” and “Trend of Multi Action Press Forming”.


3. Paper presentations in JSTP annual meeting
Following is the list of papers concerning forging technology that were presented at the annual meeting of JSTP2015-2016.

(1) Yuki Kanda, Yoshinori Yoshida & Zhigang Wnag: Influence of heating methods of metallic material on friction coefficient identification at elevated temperature
(2) Tomonori Sasa, Zhigang & Takashi Soga: The Surface Crack on Stainless Steel Nut
(3) Takashi Nomura, Nguyen Sinh Con, Kazuhiro Kitamura & Keiichi Matsunaga: Influence of
material fracture of asymmetrical forming on upsetting
(4) Shinobu Narita, Takeshi Uemori, Kunio Hayakawa & Yoshihiro Kubota: Application of combined hardening law on numerical simulation on multi-step forging process
(5) Shinichi Enoki, Song Yuher, Takashi Ueda & Shuichiro Yamaoka: Effect of punch stroke for formability in forging/assembly of two-layer tube
(6) Kengo Mouri, Takeshi Arima, Michiaki Fukuya & Toshio Terasaki: Study on evaluation factors for void closure in multi pass forging
(7) Atsuo Watanabe: Prediction of ductile fracture in cold forging
(8) Kanchi Katanoda, Sakuko Jotsuka & Tatsuya Tanaka: A study about forging Workability of ultra-grained semi-solid light metal
(9) Nobuo Yoshikawa, Tomohiro Yamashita, Satoshi Shirakami, Shigeru Yonemura, Tohru Yoshida, Osamu Kada & Yutaka Neishi: Work Hardening Behavior in Large Strain Region for Sheet Metal Forging (2nd report)
(10) Tsuyoshi Muraoka, Tsubasa Tsubouchi & Takashi Kuboki: Fabrication of coiled springs with high rectangular ratio in cross-section from hollow coil and its evaluation
(11) Shiro Torizuka & Yoshihiro Hanamura: Excellent Mechanical Properties of 0.1C-2Si-5Mn Fine Fresh Martensite
(12) Eiji Abe, Takamitsu Goto, Nobuki Yukawa & Takashi Ishikawa: Thermal effect of Variable Slide Motion on Dimensional Accuracy of Cold Backward Extrusion Using servo drive press
(13) Takuji Ootake, Eiji Abe, Nobuki Yukawa, Takashi Ishikawa, Shingo Sakurai & Masanao Fujiwara: Review of Softening Ratio Prediction Method in Alloy718 and Effects of the δ phase on the Softening
(14) Takuma Kagechika, Ryo Matsumoto & Hiroshi Utsunomiya: Influence of heat transfer characteristic of die specimen interface on shape accuracy of forged specimen in cold backward Extrusion with step ram motion.
(15) Tadatsugu Yoshida: Study of CAE Solver Based on Elementary Processes of Deformation —4
(16) Ken-ichiro Mori, Yoshimitsu Murata & Tomoyoshi Maeno: Control of thickness of transient zone in successive forging of tailored blank for hot stamping
(17) Marko Vilotic, Leposava Sidanin, Sergei Alexandrov & Yeau-Ren Jeng: Severe Plastic Deformation by V-Shape Dies
(19) Ayami Nagai, Kenji Seiko, Akira Yanagida & Jun Yanagimoto: Acquisition of trues stress-true Strain curve of Ti-6Al-4V by quasi-isothermal compression test
(20) Hideki Kakimoto & Tomonori Ikegami: Study of Flow Stress Model in Hot Free Forging
(21) Akira Yanagida, Satoko Horikoshi, Sosei Kakiuchi, Kenji Sekido & Jun Yanagimoto: Novel inverse analysis method to determine true stress-true Strain curve under dynamic recrystallization
(22) Kazutake Komori: Ductile Fracture Prediction in Upsetting Using the Ellipsoidal Void Model
(23) Tadatsugu Yoshida: Study of CAE Solver Based on Elementary Processes of Deformation —3
(24) Eisuke Murai, Maho Mori, Syoji Nakayama & Yasuyuki Kondo: Piercing extrusion for long hollow component
(25) Sachihiko Isogawa & Kouki Izumi: Study of Grain growth behavior by semi-Shearing work
(26) Takefumi Arikawa, Syohei Horie, Takahiko Nozaki, Yasunori Kagawa, Hideki Kakimoto & Syuhei Kurokawa: Generation Behavior of Surface Defects in Hot Folding Process
of Stepped Plate Study on Forming Process for Large Forged Crank Throw
(27) Toshinaka Shinbutsu, Shuuichi Amano, Teruie Takemasu & Toshihiko Kuwabara: Thread Rolling and Tensile Strength Tests of New Anti-loosening Bolt Fasteners Based on Coarse-Single Coarse-multiple Double Threaded Screw Mechanism
(28) Naohiro Kito, Akira Tanabe, Masahiro Teraoka & Kenji Gyobu: For improvement of the establishment and the mold durability of the cup molding method having a tooth profile on the outer Periphery
(30) Yoshihi Tatematsu, Mitsuka Morimoto & Kazuhiko Kitamura: Flanging of Oil-Filled Thick-Walled Tube by Axial Compression
(31) Mitsuka Morimoto, Yoshihi Tatematsu, Kazuhito Akaoo & Kazuhiko Kitamura: Forming of Flange of Tube with Sealing Liquid
(32) Okuda Masaki, Sunami Fujio, Kubota Satoshi, Koza Asuka & Kim Soo-Young: Detection of Failure in Forging Process Using Bolt Type Piezo Sensor
(33) Masatoshi Sawamura, Yasuhiro Yogo, Michiaki Kamiyama & Noritoshi lwata: Evaluation of Instantaneous Friction Coefficient under Hot Forging Conditions by a Developed Ring Compression Test Using a Rotating Tool (2nd report : Influence of Nitrogen Atmosphere)
(34) Kazuhito Asai, Kazuhiko Kitamura & Nobuki Yukawa: Evaluation of Tribological Performance of Lubricant for Hot Forging by Low-Speed Ring Compression Test Considering Heat Transfer Coefficient
(35) Tsuchiya Yoshinari, Ohira Taketoshi & Zhigang Wang: Relationship between high temperature properties and friction behavior of lubricants for hot forging
(36) Koki Tada, Hiroshi Utsunomiya & Ryo Matsumoto: Effect of Slide Motion in Die-Quench Forging of AA6061 Alloy Billet
(37) Ryo Matsumoto & Hiroshi Utsunomiya: Discussion on Punch Wear in Forming of Hole with Pulse Ram Motion on a Servo Press
(38) Ken Yamamichi, Kiichiro Kawamoto & Hiroyuki Ando: Reduction of forging process number for multi-step shaft using a Servo Press