

## The 103rd ISIJ Meeting Programme

### POSTER SESSIONS

#### -- IRONMAKING --

APRIL 3, 1982 10:00 - 12:00

1 Physical properties of coal-water slurry as coal-based energy. Hiroyuki Ishimatsu, et al. ....	S1
2 Uniform injection test of slurry with circulating loop system. (Development of injection technique of petroleum coke-oil slurry into blast furnace--II). Mikio Deguchi, et al. ....	S2
3 Atomization of auxiliary fuels for blast furnace. Yasuo Kamei, et al. ....	S3
4 Combustion of pulverized coal in blast furnace. Teruhisa Shimoda, et al. ....	S4
5 Development of a mass flow meter for blast furnace coal injection. Tadaaki Iwamura, et al. ....	S5
6 Low temperature induration of water glass bonded briquettes. Shigeo Matsubara, et al. ....	S6
7 Pilot plant test of new cold bonded pellet process. (Investigation of cold bonded pellet--VI). Seiji Matsui, et al. ....	S7
8 Effect of mineral differences and particle size of feed ores on high temperature properties of cold bonded pellets. Ryo Watanabe, et al. ....	S8
9 Desulfurization test of dust pellet by preheating treatment. Katsuyoshi Fukami, et al. ....	S9
10 Reduction of carbon coated iron ore briquette by rotary kiln. (Production of direct reduced iron using petroleum residue--II). Dentaro Kaneko, et al. ....	S10

#### -- STEELMAKING --

APRIL 2, 1982 13:00 - 15:00

11 Connection and development of hot metal treatment and the combined blowing. process. (Investigation of STB process--V). Shōji Anezaki, et al. ....	S11
12 Operation of pretreatment of hot big iron and the reaction of them in converter. Masaho Kimura, et al. ....	S12
13 The characteristics of decarburization of dephosphorized hot metal. (Decarburization of dephosphorized hot metal--I). Yasuhisa Nakamura, et al. ....	S13
14 Quantitative study of splash in top and bottom blowing converter--I. (Decarburization of dephosphorized hot metal--II). Yasuyuki Nakao, et al. ....	S14
15 Results of slag less refining test in converter. (Decarburization of dephosphorized hot metal --III). Akiyoshi Minami, et al. ....	S15
16 Influence of oxygen on the dephosphorization by soda ash. Shinji Kuriyama, et al. ....	S16
17 Oxygen potential at slag-metal interface during dephosphorization of C-sat. iron by soda ash. Kazuhiro Nagata, et al. ....	S17
18 Dephosphorization of pig iron with lime-oxygen injection in 100-kg induction furnace. Toshiyuki Kaneko, et al. ....	S18
19 Measurement of heat capacity and thermal conductivity of molten slag by laser flash method. Toshikazu Sakuraya, et al. ....	S19
20 Estimations of oxygen and nitrogen absorptions of molten steel during tapping from the converter. Takao Choh, et al. ....	S20
21 Measurements of bubble dispersion within molten iron contained in a small induction furnace. Masahiro Kawakami, et al. ....	S21

\* Tetsu-to-Hagané, 68(1982), No. 4 contains S1 to S323 preprints in Japanese of Poster Sessions and Paper Presentations and Tetsu-to-Hagané, 68(1982), No. 5 does S325 to S664 preprints of them.

The preprints of Symposia were published in Tetsu-to-Hagané, 68(1982), No. 2, A1 to A116, in Japanese.

-- PROPERTIES OF IRON AND STEEL --

APRIL 1, 1982 13:00 - 17:00

22 Relation between temper embrittlement and acoustic emission in $2\frac{1}{4}$ Cr-1Mo pressure vessel steel. Yoji Matsumoto, et al. ....	S325
23 Quantitative evaluation of hydrogen embrittlement susceptibility in temper embrittled $2\frac{1}{4}$ Cr-1Mo steels by fracture toughness test. Isamu Takagi, et al. ....	S326
24 Convenient evaluation method on hydrogen embrittlement susceptibility in various temper embrittled $2\frac{1}{4}$ Cr-1Mo steels. Isamu Takagi, et al. ....	S327
25 Effect of environments and corrosion conditions on HIC of line pipe steel. (Study on fracture behaviour of line pipe steel under sour gas environment --V). Yasuo Kobayashi, et al. ....	S328
26 On the mechanism of hydrogen induced cracking of steel in the wet hydrogen sulfide environment. Akio Ikeda, et al. ....	S329
27 $J_{IC}$ values of CT specimens with side grooves by the DCGC method. Toshiya Akiyama, et al. ....	S330
28 Metallurgical factors controlling the scatter of crack opening displacement. Yokimi Kawashima, et al. ....	S331
29 Evaluation of correlation and extrapolation of creep rupture data by generalized regression method. Akihiro Matsuzaki, et al. ....	S332
30 Long time creep data and 100 000 h creep strength for carbon steel plate (SB49). Shin Yokoi, et al. ....	S333
31 Creep rupture strength and strain-time data for Alloy 800H. Akimitsu Miyazaki, et al. ....	S334

SYMPOSIA

-- IRONMAKING --

APRIL 1, 1982 13:00 - 17:00

Chairman: Motohiko Iizuka

Theme I. Oilless Operation Technique of Blast Furnace

1 Technical problems of oilless operation and present status of alternative fuel injection technique on blast furnace. Hiromitsu Takahashi, et al. ....	A1
2 On the defects and improving methods of oilless blast furnace operation. Yoshio Okuno, et al. ....	A5
3 COM injection into all tuyeres of Kashima No. 3 Blast Furnace, Sumitomo Metal Industries, Ltd. Ichiro Kurashige, et al. ....	A9
4 Injection technique of tar-coal mixture into a blast furnace. Hiroshi Saito, et al. ....	A13
5 Pulverized coal injection into No. 1 Blast Furnace at Oita Works, Nippon Steel Corp. Masaki Baba, et al. ....	A17

-- STEELMAKING --

APRIL 3, 1982 13:00 - 17:00

Chairman: Kazumi Mori

Vice-Chairman: Kiminari Kawakami

Theme II. Developments of New Steelmaking Processes in BOF

6 Equilibria and kinetics of slag-metal reactions. Katsumi Mori, et al. ....	A21
7 Development of top and bottom blowing process in BOF. Seiichi Masuda, et al. ....	A25
8 Mixing effect and metallurgical characteristics in LD circulating lance process. Yoshihiko Kawai, et al. ....	A29
9 On the new blowing process by top and bottom blowing converter. Shuzō Itō, et al. ....	A33
10 Metallurgical and blowing characteristic in the LD-OB process. Kazuo Okohira, et al. ....	A37
11 Characteristics of bath mixing and metallurgical reactions in Q-BOP, LD, and top and bottom blowing processes. Kenji Saito, et al. ....	A41

-- PLASTIC WORKING AND OTHER FABRICATION PROCESSES --

APRIL 1, 1982 13:00 - 17:00

Chairman: Shigemi Ando

Theme III. On the Manufacturing Processes and Properties of Zn and Zn-alloy Plated Steel Sheets

12 Hot-dipped one-side galvanizing steel sheet produced by stop-off coating process. Syoji Sijima, et al. ....	A45
13 Research and development of one-side hot dip galvanizing process. Yutaka Ohkubo, et al. ....	A49

14	Research and development of one-side hot dip galvanizing process --E.M.P./U.C.P.--. Yoshio Kitazawa, et al.	A53
15	Protective properties of the Zn-alloy plating. Joji Oka, et al.	A57
16	Ni-Al alloy plated steel sheet with high corrosion resistance. Atsuyoshi Shibuya, et al.	A61
17	Production of Zn-Ni alloy plated steel sheet. Takao Saito, et al.	A65
18	Development of double-layer alloy-electroplated steel sheet. Shibeki Kiriha, et al.	A69

-- PROPERTIES OF IRON AND STEEL --

APRIL 3, 1982      13:00 - 17:00

Chairman: Shozo Abeyama

Theme IV. Progress in Free Machining Steel Technology		
19	A review on the researches of free machining steels. Toru Araki.	A73
20	Machinability improvement of steels. Sadayoshi Furusawa, et al.	A77
21	Machinability of free machining steels with ferritic-martensitic duplex structure. Shigeo Yamamoto, et al.	A81
22	Quality of low carbon resulphurized free machining steel through continuous casting process. Yoshiji Yamamoto, et al.	A85
23	Application of free machining steel wire to cold forging. Tetsu Ohno, et al.	A89
24	Feasibility studies of free machining microalloyed steels for automobile components. Makoto Osawa, et al.	A93
25	The merits of free machining steels in mass production lines. Masahiro Kuwahara.	A97

Chairman: Hiroshi Mimura

Theme V. Ductile Fracture in Steel Structure		
26	The effects of notch acuity on ductile fracture characteristics. Takeo Suzuki, et al.	A101
27	A study on stable ductile crack growth and unstable fracture initiation based on J and crack opening angle concepts. Shuji Aihara, et al.	A105
28	Fracture absorbed energy of materials with regard to propagating shear fracture of line pipes. Masatoshi Tsukamoto, et al.	A109
29	Evaluation of resistance to propagating shear fracture of UOE pipe by West-Jefferson type test. Yoshihiro Kataoka, et al.	A113

Lunch

PAPER PRESENTATIONS

-- PLASTIC WORKING AND OTHER FABRICATION PROCESSES --

APRIL 1, 1982

303	Production of arc welded large diameter stainless steel pipes by UOE-process. Jun-ichiro Takehara, et al.	S335
304	Development of line pipe steels by accelerated cooling after controlled rolling--I. Mamoru Ohashi, et al.	S336
305	Strength analysis on the screw of mechanical expander pull-rod in UOE mills. Kenji Nakano, et al.	S337
306	Effect of fin pass forming conditions and downhill forming conditions on shape of steel pipe in cage roll ERW forming. Takaaki Toyooka, et al.	S338
307	Shield E.R.W. for Cr-Mo steel boiler tubes. Yasuo Kimiya, et al.	S339
308	Deformation behavior of material in tube upsetting. (Study on upsetting of tube ends--I). Shohei Kanari, et al.	S340
309	Some improvements on cold drawn fin-tubes. Yasuyuki Hayashi, et al.	S341
310	Study on the make-up condition and the water leak property of a 9-5/8" oil well casing joint. Yoichi Yazaki, et al.	S342
311	Energy conservation of the C. C. bloom reheating furnace. Kenji Doi, et al.	S343
312	Influence of charged or discharged slab temperature on fuel input. (Numerical analysis of heat transfer in the continuous reheating furnace--I). Masahiro Abe, et al.	S344
313	Development of the optimum hot operation computer control system. Katsunari Yoshida, et al.	S345
314	Effect for energy saving by ceramic fiber insulation for skid pipe of reheating furnace. Sueo Usui, et al.	S346
315	Roll data system by personal computer. Ken-ichi Masuda, et al.	S347

- 
- 316 Improving the cooling method of work roll in hot finisher mill.  
Syohei Murakami, et al. .... S348
- 317 Measuring of work-roll temperature in hot strip mill. (Study on cooling  
of roll in hot strip mill--I). Kyohei Murata, et al. .... S349
- 318 Saving of water for cooling of work roll in hot strip mill. (Study on  
cooling of roll in hot strip mill--II). Kyohei Murata, et al. .... S350
- 319 Lowering of ejection pressure of water for cooling of work roll in hot  
strip mill. (Study on cooling of roll in hot strip mill--III).  
Kyohei Murata, et al. .... S351
- 320 Relation between water flow rate and warpage of flat steels and edged  
steels. (Study on decrease of quenching distortion of edged steels--I).  
Masahiro Nakajima, et al. .... S352
- 321 Mean value of heat transfer coefficient during jet water cooling of  
edged steels. (Study on decrease of quenching distortion of edged  
steels--II). Yoshio Hamajima, et al. .... S353
- 322 Study on the conduction of heat in a steel disk during cooling.  
Toshiyuki Murakami, et al. .... S354
- 323 Heavy reduction technique of slab width with sizing edger mill. (New  
process for direct connection of steelmaking plant to rolling mills--IV).  
Nobumasa Mizoguchi, et al. .... S355
- 324 Development of CC-DR process in hot strip rolling. Hidemitsu  
Takahashi, et al. .... S356
- 325 The precipitation behaviours of aluminum nitride in austenite.  
Siroh Sanagi, et al. .... S357
- 326 Reduction of crop loss in slab edge rolling--I. Tetsu Matoba, et al. .... S358
- 327 Effect of slab reheating temperature on the formability of SUS 430  
continuously cast and hot rolled by one pass--I. Jiro Harase, et al. .... S359
- 328 Relation between CC slab surface defect and hot coil surface defect.  
Shuji Kobayashi, et al. .... S360
- 329 Effect of rolling conditions on annihilation process of loose structure.  
Mitsuo Tomonaga, et al. .... S361
- 330 Manufacturing of cupro-nickel clad steel slab by press bonding.  
Hitoshi Nakamura, et al. .... S362
- 331 Plane view control in plate rolling. (Deformation properties--I).  
Sadakazu Masuda, et al. .... S363
- 332 Examination in hot rolling. (Study on the plane view pattern control  
by partial lubrication--II). Yoshio Oike. .... S364
- 333 Controlled rolling technics at No. 2 plate mill in Mizushima Works  
of Kawasaki Steel Corp. Hiroshi Nishizaki, et al. .... S365
- 334 Roll eccentricity compensation control for heavy plate mill with  
hydraulic AGC system--I. Tamao Yokoi, et al. .... S366
- 335 Absolute gage control for heavy plate mill with hydraulic AGC system--II.  
Kazuharu Hanasaki, et al. .... S367
- 336 Experimental rolling of lead miniature slab for simulating the effect  
of skid mark in plate rolling. (Research on plane view control technology  
of hot plate--I). Teruo Kono, et al. .... S368
- 337 Experimental study on width variation by skid mark with miniature lead  
slab. (Research on plane view control technology of hot plate--II).  
Ryuichi Oozono, et al. .... S369
- 338 Curtailment of the unit consumption of the rolling oil with hybrid  
system. Harumasa Muramoto, et al. .... S370
- 339 Evaluation of polishing-oil for stainless cold process.  
Yasuo Izumi, et al. .... S371
- 340 The study of machine diagnosis technique by ferrography.  
Motofumi Kurahashi, et al. .... S372
- 341 Base oils and fatty acid using hot strip test mill.  
Kazumoto Nakamura, et al. .... S373
- 342 Effects of reduction heating conditions on the wetting characteristics  
of annealed Al-killed steel. Yukio Uchida, et al. .... S374
- 343 Effects of lead content in the zinc bath and bath temperature on the  
wetting characteristics of steel sheet. Yusuke Hirose, et al. .... S375
- 344 The effect of surface characteristics of Si containing steel to the  
adhesion properties of galvanized layer. Yasuo Tsuchiya, et al. .... S376
- 345 Influence of alloying elements and zinc-bath-temperature on adhesion  
of hot-dipped galvanized high strength steels. Jun-ichi Inagaki, et al. .... S377
- 346 Influences of Fe concentration in coating layer and Al in galvanizing  
bath on formability of the galvannealed steel sheet. Junji Kawabe, et al. ... S378
- 347 X-ray diffraction pattern in galvannealed steel sheet.  
Toshio Nakamori, et al. .... S379
- 348 Development of one-side galvanizing. (Development of one-side galvanized  
and aluminized steels--I). Masahiko Itoh, et al. .... S380
- 349 Properties of one-side hot dip aluminized steel sheet. (Development of  
one-side galvanized and aluminized steels--II). Kiichiro Katayama, et al. ... S381

---

APRIL 2, 1982

350 Effect of roll diameter on mechanical properties of cold rolled sheet. Siroh Sanagi, et al. ....	S382
351 Characteristics of shape controller by TDC(Tension Distribution Control). Masaru Okado, et al. ....	S383
352 Closed loop shape control of cold strip mill. Yasumasa Nariai, et al. ....	S384
353 Roll eccentricity control at cold rolling mill. Takuya Araki, et al. ....	S385
354 Improvement of edge wave in tension levelling for rimmed steel. Takeshi Masui, et al. ....	S386
355 All digital speed control at tandem cold mill--I. Hihumi Tsukuda, et al. ....	S387
356 Tension control system of multi-purpose continuous annealing line. Hiromasa Yamamoto, et al. ....	S388
357 Utilization of strip temperature control for non oxidizing furnace. Mitsuru Matsumoto, et al. ....	S389
358 Development of a stack arrangement system of cold rolled coils batch annealing. Norihiro Saito, et al. ....	S390
359 Intermediate universal rolling method for straight-web type sheet pilings. Taneharu Nishino, et al. ....	S391
360 Sizing roller guide for straight-web type sheet pilings. Taneharu Nishino, et al. ....	S392
361 Finishing universal rolling method for straight-web type sheet pilings. Taneharu Nishino, et al. ....	S393
362 Load in universal rolling of H-beams. Ken-ichi Yamamoto, et al. ....	S394
363 On-line production information control system for an existing bloom yard. Hidehiko Nagatomi, et al. ....	S395
364 Automation for a wide flange shape mill, mainly for finishing line. Toshihiro Oka, et al. ....	S396
365 CO <sub>2</sub> laser welding with plasma utilizing. Katsuhiro Minamida, et al. ....	S397
366 Laser beam square butt welding of electrical steel strip. Kouji Ono, et al. ....	S398
367 Development of wavy pattern overlay welding technique for continuous casting machine roll. Tsuguo Honda, et al. ....	S399
368 Prevention of cracking of sleeved back-up rolls. Hiroshi Goto, et al. ....	S400
369 Improvement in cutting efficiency of round billet adopting a new type of cold saw blade shape. Toshiaki Hosoda, et al. ....	S401

APRIL 3, 1982 .

370 On-line slab width gauge with laser displacement gauge. Yoshiaki Kaneda, et al. ....	S402
371 On-line test operation results of eddy current inspection method using rotating probes for hot steel rods and wires. (Studies on the surface defect of hot steel--VIII). Ken-ichi Miyata, et al. ....	S403
372 Width gauge using ultrasonic distance meter for hot strip mill. Yoshimi Fukutaka, et al. ....	S404
373 Online inspector for roll mark of hot strip. Takashi Fukuyama, et al. ....	S405
374 Development of hot metal detector (H.M.D.) making use of optical fiber. Tomohiro Marui, et al. ....	S406
375 Sheet surface flaw detection system. Ikuo Katano, et al. ....	S407
376 Noncontact hardness meter at continuous annealing line. Satoru Takahashi, et al. ....	S408
377 Development of ultrasonic B and C scope system. Kazuo Fujisawa, et al. ....	S409
378 Problem and its counterplan about response of operational on-line control system at steelworks. Masayasu Mizutani, et al. ....	S410
379 Effect of initial scale on roughness of high carbon steel wire rods. Toshio Fujita, et al. ....	S411
380 Mechanical descaling of steel wire rod. Hiroshi Sasaki, et al. ....	S412
381 On line electrolytic descaling of wires. Takashi Fukuda, et al. ....	S413
382 Electrolytic descaling of alloy wires. Nobuyuki Maruyama, et al. ....	S414
383 Deformation behavior of the artificial defects on the bloom C. C. billet rolling-wire rod rolling process. Yutaka Sagae, et al. ....	S415
384 Comparison of the deformation efficiency between square-flat pass and square-diamond pass. Hiroyuki Hayashi, et al. ....	S416
385 Caliberless rolling in bar mill. (Development of caliberless rolling--III). Ryo Takeda, et al. ....	S417
386 Centering device for entry roller guide of bar mill. Yoshimi Fukutaka, et al. ....	S418
387 Automatic ultrasonic testing equipment of steel rods. Kazuo Yamaguchi, et al. ....	S419
388 New tapered-rod forming process for coil springs. Makoto Saito, et al. ....	S420
389 Set up calculation model of hot strip finisher. Ryoichi Takahashi, et al. ..	S421
390 Simulation for optimum control of hot strip finishing mill looper. Yoshitaka Hayashi, et al. ....	S422

391	Measurement of strip tension in hot rolling. (Study on the tension control system of hot strip finishing mills--I). Makoto Shitomi, et al. ....	S423
392	Study of looper control system. (Study on the tension control system of hot strip finishing mills--II). Kouzou Ishikawa, et al. ....	S424
393	Decrease of slab width fluctuation by heavy width reduction in hot strip rougher mill. Nobuo Fukui, et al. ....	S425
394	Adoption of hydraulic screw down system for hot strip mill. Kenji Fujiyama, et al. ....	S426
395	Adoption of hydraulic system to down-coiler. (Improvement of coiling technique for hot strip mill--I). Tooru Kondo, et al. ....	S427
396	Automatic jumping control system of application to down-coiler. (Improvement of coiling technique for hot strip mill--II). Shunji Watanabe, et al. ....	S428
397	The development of down-coiler with adiabatic segments. Mitsunori Abe, et al. ....	S429
398	Development of shape recognition system for hot strip metal. Kazuo Takashima, et al. ....	S430
399	Shape control by hot strip mill with variable crown backup roll. Toshihiko Nagai, et al. ....	S431
400	Improvement of profile in hot strip mill. (Improvement of edge drop by work roll shift process). Hiroshi Shibayama, et al. ....	S432
401	The effect of decrease bender. (Crown control by large-crowned back-up roll in hot strip mill--II). Mikie Tokunaga, et al. ....	S433
402	Roll eccentricity control system for 4 HI rolling mills. Shigeo Watanabe, et al. ....	S434
403	Strength of hot rolling mill housing where screw nut is installed. Tsugio Iwata, et al. ....	S435
404	Experimental rolling of lead miniature slab for simulating the effect of skid mark at roughing stands in hot strip mill. Takashi Shibahara, et al. ....	S436
405	Manufacture of high Si-Mn as-hot-rolled dual phase steel. Yoshio Hashimoto, et al. ....	S437
406	Effect of scale exfoliating strength of steel at high temperature on descaling behavior during hot rolling. Masahiko Morita, et al. ....	S438
407	Crack and corrosion resistivity of coated film in bending of precoated galvanized steel. Hironori Kozawa, et al. ....	S439
408	Predicting on the service life of silicon polyester resin coated steel sheet. Eiki Takeshima, et al. ....	S440
409	Predicting on the service life of polyvinyl chloride resin coated steel sheet. Toshinori Kawano, et al. ....	S441
410	Unifying method of polyethylene lining film on large diameter pipe by rotating speed control. Mansei Tanaka, et al. ....	S442
411	Effect of environmental conditions on mechanical properties in polyethylene films applied on steel pipes. Toshiaki Shiota, et al. ....	S443
412	Quality control system for tinplate production at the Fukuyama Works of NKK. (Quality control for tinplate products--I). Mutsuho Sugii, et al. ....	S444
413	Surface inspector for tin-coated sheet. (Quality control of tinplate products--II). Norio Yumiba, et al. ....	S445
414	Evaluation method of lacquer adhesion of TFS. Yoshitaka Kashiyama, et al. ....	S446
415	Properties of steel surface cleanliness and electrolytic conditions at the cleaning line. Toshitake Hanazawa, et al. ....	S447
416	Oxidation of cold rolled steel sheets in gaseous combustion products and conditions for the reduction of oxides. Hiromitsu Naito, et al. ....	S448
417	Effect of Bi coating before annealing on initial anticorrosion resistance of cold rolled steel. Shigeo Kurokawa, et al. ....	S449
418	Rust stabilization treatments of atmospheric corrosion resistant steel. Takao Kurisu, et al. ....	S450
419	Preparation of Zn-Fe phosphates and its chemical property. Koichi Nishizaka, et al. ....	S451
420	Factors that control the phosphatability on Si-Mn dual phase steel. (Research and development of high strength steel sheet for automobiles). Shigeyoshi Maeda, et al. ....	S452
421	Factors governing paint adhesion after water immersion test in Fe-Zn alloy electroplated steel sheets. Massaaki Yamashita, et al. ....	S453
422	Corrosion of electrodeposited Ni/Zn alloy: Electrochemical and morphology studies. David Siitari, et al. ....	S454
423	Workability of electro-plated layer, and corrosion resistance as pointed after forming in Zn-Fe/Zn-Ni double-layer electro-plated steel. (Development of double-layer electro-plated steel sheet--III). Mitsutoshi Sakaguchi, et al. ....	S455
424	The pH changes at cathode and anode surface in high current density electrodeposition. Hironobu Kawasaki, et al. ....	S456
425	Development of the estimating method of underclad cracking. (Study on underclad cracking of nuclear pressure vessel steels--I). Takao Horiya, et al. ....	S457

426 A new parameter of underclad cracking susceptibility. (Study on underclad cracking of nuclear pressure vessel steels--II). Takao Horiya, et al. ....	S458
427 Effect of chemical composition on the toughness of SA508 Cl.3 steel for reactor pressure vessel. (Manufacturing technology and material properties of large size forgings for nuclear power plant--I). Mikio Kusuhashi, et al. ....	S459
428 Manufacturing technology and material properties of heavy thickness tube sheet forging. (Manufacturing technology and material properties of large size forgings for nuclear power plant--II). Shigeo Mori, et al. ...	S460
429 Influence of Si and P contents on strength at elevated temperatures and toughness in 1 1/4Cr-0.5Mo steel. (Stabilization of properties of heavy section 1 1/4Cr-0.5Mo steel plates--I). Makoto Yamada, et al. ....	S461
430 Effect of minor alloying elements on mechanical properties of 1 1/4Cr-0.5Mo steel. (Stabilization of properties of heavy section 1 1/4Cr-0.5Mo steel plates--II). Seishi Tsuyama, et al. ....	S462
431 Heat treatment properties of a heavy section 1 1/4Cr-0.5Mo steel plate. (Stabilization of properties of heavy section 1 1/4Cr-0.5Mo steel plates--III). Seishi Tsuyama, et al. ....	S463
432 Effect of alloying elements on creep rupture strength of Cr-Mo steels for pressure vessels. Satoshi Igari, et al. ....	S464
433 The improvement of the ductility of high carbon steel wires by increment of Si content. (Development of direct-patented high strength steel wire rod--I). Toshihiko Takahashi, et al. ....	S465
434 High strength steel wire rod for prestressed concrete wire and strand containing 0.8 % C and 1 % Si. (Development of direct-patented high strength steel wire rod--II). Youji Hida, et al. ....	S466
435 Influence of producing conditions on the torsion properties of high strength steel wire. Takasi Tukamoto, et al. ....	S467
436 Effect of electromagnetic stirring on flattening and forming characteristics of high carbon steel wire rods. Iwao Nakagawa, et al. ....	S468
437 An examination of blast-mist mixture cooling of high carbon wire rods. Tadamasa Yokoyama, et al. ....	S469
438 Effect of the microstructure and drawing on the flat rolling of high carbon strel rods. Toyoaki Eguchi, et al. ....	S470
439 Quality of suspension spring steel produced by bloom-continuous cast machine. Takahiko Nagamatsu, et al. ....	S471
440 Development of heat-treatment free steels for machine structural use. (Controlled rolling in bar products--III). Takashi Abe, et al. ....	S472
441 Thermo-mechanical treatment of steel bars. (Strength-toughness relationship of controlled rolled steel bars--I). Fukukazu Nakasato, et al. ....	S473
442 Relation between workability, hot rolling condition and hardness of SCM steels without soft annealing. Takashi Nishimura, et al. ....	S474
443 Embrittlement of non-heat-treated bolt on galvanizing. Tetsuo Shiraga, et al. ....	S475
444 Wear properties of high carbon cast steels at elevated temperatures. Toshihiko Takahashi, et al. ....	S476
445 Effect of alloying elements on the strength and wear resistance of high carbon steels. Kozo Fukuda, et al. ....	S477
446 Wear characteristics of ultra high carbon steels. Hisakichi Sunada, et al. ....	S478
447 Effects of various surface treatments on the wear resistance, fatigue strength and heat checking characteristics of tool steels. Keiichi Hayashida, et al. ....	S479
448 Effect of microstructure on the toughness of 5 % Cr hot work alloy tool steels. Toshio Okuno. ....	S480
449 The properties of nitrogen containing P/M high speed steels. (Effect of nitrogen on the properties of P/M high speed steels--VI). Minoru Hirano, et al. ....	S481
450 Influence of wheel/rail contact conditions on head checks defect in rail. Jun-ichiro Takehara, et al. ....	S482
451 Residual stress of heat-treated rails. (A study on the residual stress of rails--IV). Chikayuki Urashima, et al. ....	S483
452 Fatigue crack propagation measurement of rails by unloading elastic compliance method. (Study on fatigue properties of rails--IV). Shin-ichi Nishida, et al. ....	S484
453 Effect of the condition in thermomechanical treatment on tensile properties of 350 kgf/mm <sup>2</sup> grade maraging steel. Seiichi Muneki, et al. ....	S485
454 Recrystallization of reverted austenite of 18 Ni maraging steels. Koji Shibata, et al. ....	S486
455 The effect of aging condition on the tensile properties and fracture toughness of Co-free maraging steels. Hiroyuki Morimoto, et al. ....	S487
456 On the free-cutting non-magnetic high manganese steels. Susumu Kanbara, et al. ....	S488

457	The effect of alloying elements and strengthening methods on the mechanical properties of 18Mn-15Cr non-magnetic steels. Yoshihide Fuchino, et al. ....	S489
458	Mechanical properties of 32Mn-7Cr austenitic steel at low temperatures. (Study on high manganese non-magnetic steel for cryogenic application--III). Ritsu Miura, et al. ....	S490
459	Rolls of non-magnetic steels for electromagnetic stirrers in continuous casting machines. Atsunobu Shintani, et al. ....	S491
460	Effects of P, S and Mo contents on mechanical properties of base metals and toughness of weld bonds of 9 % Ni steels. Osamu Furukimi, et al. ....	S492
461	Crack initiation and arrest characteristics of 9 % Ni steels. Yoshifumi Nakano, et al. ....	S493
462	Properties of matching ferritic filler MIG welds of 9 % Ni steel. Akio Kamada, et al. ....	S494
463	Some properties of 9 % Ni cast steel. Koh-ichi Kohshiro, et al. ....	S495
464	Hot ductility of Fe-36%Ni alloys. Satoshi Nishimura, et al. ....	S496

-- PROPERTIES OF IRON AND STEEL --

APRIL 1, 1982

465	The effect of Al and N-contents upon the mechanical properties of direct-quenched and tempered steel plates. Nozomi Komatsubara, et al. ....	S497
466	The influence of hot-rolling conditions on the strength and toughness of direct-quenched and tempered steel plates. Seiichi Watanabe, et al. ....	S498
467	Direct quenching after ( $\gamma+\alpha$ ) controlled rolling using on-line accelerated (OLAC) facilities. Kazuaki Matsumoto, et al. ....	S499
468	Effect of finishing temperature in hot rolling on mechanical properties and microstructure in controlled cooled steels. Masahiro Machida, et al. ....	S500
469	Improvement in low temperature toughness of 6 % Mn steel by Mo addition and control of rolling variables. Masato Murakami, et al. ....	S501
470	Effect of rolling conditions on mechanical properties. (Study on toughness of through thickness direction in controlled rolled steel--I). Tamotsu Hashimoto, et al. ....	S502
471	Brittle fracture behavior of steel with separation and improvement of toughness of through thickness direction. (Study on toughness of through thickness direction in controlled rolled steel--II). Kazushige Arimochi, et al. ....	S503
472	Study on performances of steel plate having no separations on Charpy fractured surface. Shuichi Suzuki, et al. ....	S504
473	Material properties of Y.P. 36 kgf/mm <sup>2</sup> controlled rolling plate for high heat input welding. Yoshifumi Sannomiya, et al. ....	S505
474	Development of controlled rolled low carbon equivalent X80 steel for Arctic linepipe. Manabu Yamauchi, et al. ....	S506
475	Measurement of transformation temperatures in control-rolled steels for accelerated cooling. Katsuhiro Itayama, et al. ....	S507
476	Properties of controlled rolled SLA 33B steel plates. (Development of special controlled rolled high toughness steel for low temperature service--I). Shigetoshi Okoshi, et al. ....	S508
477	Newly developed high Al-low N-micro Ti type controlled rolled steel for low temperature service suitable for high heat input welding. (Development of special controlled rolled high toughness steel for low temperature service--II). Motoaki Suzuki, et al. ....	S509
478	A fundamental study on the cooling facilities. (A study on the on-line accelerated cooling process in plate mill--I). Hiroshi Kamio, et al. ....	S510
479	Thermal deformation countermeasures during water cooling. (A study on the on-line accelerated cooling process in plate mill--II). Hiroshi Kamio, et al. ....	S511
480	The effect of Nb on the mechanical properties of bainitic steel produced using accelerated cooling. Sadahiro Yamamoto, et al. ....	S512
481	Development of high toughness steel plates by accelerated cooling after controlled rolling. Masaaki Nakamura, et al. ....	S513
482	Production of ultra low carbon equivalent heavy steel plate by CLC process. (Continuous on-line-control process--IV). Katsuo Kaku, et al. ....	S514
483	Development in equipment for on-line controlled cooling of plate. (Continuous on-line-control process--V). Masaki Umeno, et al. ....	S515
484	Production of low carbon equivalent high strength steel. (High strength steel produced by continuous on-line-control process (CLC)--I). Yukio Tomita, et al. ....	S516
485	Production of high tensile strength steel by direct quenching. (High strength steel produced by continuous on-line-control process (CLC)--II). Ryota Yamaba, et al. ....	S517

---

486	Influence of grain size on yield strength at intermediate and moderate temperature. (Investigation for coarse grain carbon steel for boilers --I). Nobuo Shikanai, et al. ....	S518
487	Newly developed heat resisting steel for hot blast valve. Katsukuni Hashimoto, et al. ....	S519
488	Long period creep rupture strength of heat-resistant steel bearing small amount of Cr, Mo and V. Takahiro Kanero, et al. ....	S520
489	Statistical distribution of creep-rupture times and creep-rupture strength. Yoshio Monma, et al. ....	S521
490	Tensile properties and polynomial regression of temperature for heat-resisting steels. Yoshio Monma, et al. ....	S522
491	Investigation on heat treatment conditions of 2.25Cr-1Mo steel tubes for LMFBR steam generator. Satoshi Igari, et al. ....	S523
492	Notch rupture properties of the 12Cr-Mo-V-Nb heat resisting steel. Ik-Min Park, et al. ....	S524
493	Creep properties of SAW 304 stainless steel welded joints. Masayoshi Yamazaki, et al. ....	S525
494	Effect of P, Mo and N on the high temperature creep properties of 18Cr-10Ni steel. Kenji Yokokawa, et al. ....	S526
495	Effect of Ti content on high temperature properties of cold-worked 15Cr-15Ni-2.5Mo steels for fast reactor fuel cladding tubes. Hiroyuki Uchida, et al. ....	S527
496	Creep fracture mechanism map for type 316 stainless steel. Hideo Tanaka, et al. ....	S528
497	Effect of slight addition of carbide-forming elements on the elevated temperature strength of 316 stainless steel. Hiroshi Teranishi, et al. ....	S529
498	Computer calculation of iron-carbon phase diagram. Hiroshi Ohtani, et al. ....	S530
499	Reversion of carbide precipitation in low-carbon steel. Takeshi Suzuki, et al. ....	S531
500	The relation between the coarsening of cementite particles and the growth process of matrix ferrite grains in steel. Motohiro Okade, et al. ....	S532
501	Effect of rolling temperature and preheat treatment on austenite grain size in boron steels. Masao Toyama, et al. ....	S533
502	Exploitation of rapid spheroidization annealing (RASA). (Development of in-line spheroidizing technique--I). Tetsuo Soshiroda, et al. ....	S534
503	Practical application of rapid spheroidization annealing (RASA). (Development of in-line spheroidizing technique--II). Tetsuo Soshiroda, et al. ....	S535
504	Transformation behavior and mechanical properties on the interrupted austempering treatment. Hisao Imatomi, et al. ....	S536

APRIL 2, 1982

505	Dynamic recrystallization of high carbon steel during high strain-rate, sequential hot deformation. Hiroshi Yada, et al. ....	S537
506	Recrystallization of austenite of Nb-V steel during continuous hot rolling. Yoshikazu Matsumura, et al. ....	S538
507	Deformation and recrystallization of ferritic stainless steel during hot rolling. Hiroyasu Nanatsue, et al. ....	S539
508	Deformation and recrystallization of low carbon steel during rolling in the temperature range of $\alpha$ - $\gamma$ transformation. Hideyuki Watanabe, et al. ....	S540
509	Comparison of static recrystallization behavior between ferritic stainless steel and austenitic steel. Tadashi Maki, et al. ....	S541
510	An analysis of transformation textures in steels by the Bain relation. Ei-ichi Furubayashi, et al. ....	S542
511	Mechanism of the formation of transformation texture in control-rolled steel. Hirosuke Inagaki, et al. ....	S543
512	Analysis of the textures of low-carbon cold-rolled steel sheets by means of vector method. Hajime Kitagawa, et al. ....	S544
513	Origin of nucleation of goss grain in grain oriented silicon steel by use of transmission Kossel technique. Chizuko Maeda, et al. ....	S545
514	Preferential nucleation sites of the recrystallized grains and characteristic of textures. Kohsaku Ushioda, et al. ....	S546
515	Effects of cold rolling conditions on the formation of textures in a 3%Si-Fe single crystal. Takuji Shindo, et al. ....	S547
516	Technique for surface treatment in laser irradiated grain oriented silicon steel sheet. (A method for reducing core loss of grain oriented silicon steel by laser irradiation--II). Motoharu Nakamura, et al. ....	S548
517	Effects of alloying elements on the stress corrosion cracking of low carbon 347 stainless steel in high temperature water. (A development of type 347 stainless steel for BWR pipings--I). Hiroyuki Tsuge, et al. ....	S549

518 On the strength and microstructure of low carbon 347 stainless steels. (A development of type 347 stainless steel for BWR pipings--II). Yoshiatsu Sawaragi, et al. ....	S550
519 Effect of alloying elements on the susceptibility of weld hot cracking of low carbon type 347 stainless steel. (A development of type 347 stainless steel for BWR pipings--III). Minoru Miura, et al. ....	S551
520 A study on surface treatments of stainless steel for selective solar energy absorption. Seizaburo Abe, et al. ....	S552
521 Thermal properties of stainless steel absorber for solar collector. Jiro Ohno, et al. ....	S553
522 Influence of bright annealing condition on the surface brightness and corrosion resistance of stainless steel. Tomohisa Somura, et al. ....	S554
523 Effect of alloying elements on mechanical properties of low C SUS 201 hard material. Hiroshi Hiramatsu, et al. ....	S555
524 Atmospheric corrosion resistance and its evaluation method of stainless steel for railway car structures. Michio Nakata, et al. ....	S556
525 Corrosion resistance and mechanical properties of welded temper-rolled metastable austenitic stainless steel. (Development of high tensile austenitic stainless steel for railway car structures--II). Hisashi Kondo, et al. ....	S557
526 Effect of P on primary deformation and deformed structure of 143 °C in austenitic stainless steel. (Discussion about material factor related to SCC). Yoshihiro Uematsu, et al. ....	S558
527 X-ray analysis of austenite and strain-induced martensite in deformed metastable austenitic stainless steels. (Analysis of flow curve with strain-induced transformation of austenite to martensite-I). Kazuo Hoshino, et al. ....	S559
528 Modeling and experimental equation for flow stress in metastable austenitic stainless steels. (Analysis of flow curve with strain-induced transformation of austenite to martensite--II). Kazuo Hoshino, et al. ....	S560
529 Rupture in reloading stress relaxation test for 19Cr-9Ni-1.4Mo-1.4W-Nb bolting steel. Chiaki Tanaka, et al. ....	S561
530 High temperature properties of 0.5C-25Cr-35Ni-Nb, Ti centrifugal cast alloy tubes. Tsutomu Yoshida, et al. ....	S562
531 Effects of alloying elements on DTA thermographs and solidification reactions of IN-100. (Evaluation of structures and properties of Ni-base superalloys by differential thermal analysis--II). Natuo Yukawa, et al. ...	S563
532 Evaluation of mechanical properties of IN-100 alloy. (Evaluation of structures and properties of Ni-base superalloys by differential thermal analysis--III). Natuo Yukawa, et al. ....	S564
533 Hot ductility dip caused by sulfur segregation to grain boundaries in a nickel-base superalloy. Motoaki Imamura, et al. ....	S565
534 The characteristics of A286 alloy disk manufactured from an ESR ingot. Takemitsu Honjo, et al. ....	S566
535 High temperature properties of electro-slag remelted Ni-base superalloys. Takashi Motoda, et al. ....	S567
536 Applicability of 12Cr12Ni5Mo5Cu steel to the structural material for HTGR. Manabu Tamura, et al. ....	S568
537 Notch-tensile creep properties of nickel base superalloy single crystal. Koichi Sugimoto, et al. ....	S569
538 Effects of $\alpha$ -W grain boundary precipitation treatment on high temperature properties of a Ni-Cr-W superalloy. Rikizo Watanabe. ....	S570
539 Effect of Cr content in Ni-15W superalloys on creep rupture strength and oxidation in various He gas environment. Mizuo Sakakibara, et al. ....	S571
540 Effect of specimen size on the decarburization and the creep rupture life of Inconel 617 in impure helium. Fujio Abe, et al. ....	S572
541 Effect of compositional variations and ageing treatment on the fracture behavior of 5 % Ni Cr Mo steel in air and hydrogen. Yorimasa Takeda, et al. ....	S573
542 Strength of structural steels under cathodic hydrogen charging. Yoshio Kato, et al. ....	S574
543 An evaluation method of hydrogen embrittlement susceptibility of the boundary area between stainless weld overlay and base metal. Tohru Nomura, et al. ....	S575
544 Effect of particle size and numbers of carbo-nitride on HIC susceptibility of steel. Koziro Kitahata, et al. ....	S576
545 Relationship between HIC susceptibility and precipitation of fine carbo-nitrides during hot rolling of steel. Yasushi Torii, et al. ....	S577
546 Evaluation of H <sub>2</sub> S susceptibility for linepipe by full scale circulating test. Hiroshi Nakate, et al. ....	S578
547 Some knowledgements on the sulfide corrosion cracking test by DCB method. (A study on sulfide stress corrosion cracking test--V). Kazuo Yamamoto, et al. ....	S579

---

548	Effect of alloying elements on the sulfide stress corrosion cracking resistance of AISI 4130 type Cr-Mo steels. Toru Shimada, et al. ....	S580
549	Effect of unit area size on extreme-value statistics. Masaharu Honda, et al. ....	S581
550	Corrosion resistance of aluminum sprayed steel in acidic water of river. Naoto Mikami, et al. ....	S582
551	Effect of alloying element on high-temperature corrosion of intake valve steels. Tomohito Iikubo, et al. ....	S583
552	Study on coal liquefaction pressure vessel steel. Toru Ishiguro, et al. ....	S584
553	Corrosion behavior of conventional steels in coal liquefaction environment. Yoshiaki Shida, et al. ....	S585

APRIL 3, 1982

554	Metallurgical analysis of overaging cycle in continuous annealing of cold rolled steel sheet. Kiwami Kurihara, et al. ....	S586
555	Production of drawing quality cold strip--III. (Development of process and product for continuous annealing line--XI). Osamu Nozoe, et al. ....	S587
556	Production of deep drawing sheet steel by continuous annealing a Ti added extra low carbon Al killed steel. Hiroshi Hayakawa, et al. ....	S588
557	Effect of grain size and solid-solution strengthening elements on bake-hardenability of low carbon aluminum-killed steel. Yaichiro Mizuyama, et al. ....	S589
558	Metallurgical aspects in production of bake-hardenable sheet steels for various purposes. Atsuki Okamoto, et al. ....	S590
559	Effect of phosphorus on the bake hardenability of cold rolled steel sheets. Yasushi Tanaka, et al. ....	S591
560	Renitrogenized as-rolled steel sheet characterized by a low temperature coiling. Kazutoshi Kunishige, et al. ....	S592
561	Enamelling properties of B bearing cold rolled Al killed steel sheets. Teruo Kurokawa, et al. ....	S593
562	Measurement of the change in weight by a thermobalance in a process of porcelain enamel firing. Yoshihiro Matsumoto, et al. ....	S594
563	Effect of second phase structure on the ductile fracture bahavior of two-phase steels. (Development of ferrite-bainite-(martensite) sheet steel--VI). Shun-ichi Hashimoto, et al. ....	S595
564	Effects of low temperature transformation products on the r values of multi-phase sheet steels. (Development of ferrite-bainite-(martensite) sheet steel--VII). Ichiro Tsukatani, et al. ....	S596
565	Structure characteristics of as-rolled dual-phase steels produced by a low-temperature coiling method. Takashi Furukawa, et al. ....	S597
566	Production of as-hot-rolled dual phase steel sheets by controlled cooling. Jun-ichi mano, et al. ....	S598
567	Effect of original microstructure on the mechanical properties of Si-Mn dual phase steels. Takeshi Okuyama, et al. ....	S599
568	Possibilities of achieving low yield ratio with lower manganese dual phase steel. Yoshikazu Takada, et al. ....	S600
569	Role of internal stress for the initial yielding of dual-phase steel. Tsuneaki Sakaki, et al. ....	S601
570	Strain hardening of martensite in Fe-C-Mn steels. Toshiro Hukusato, et al. ....	S602
571	Effect of C and Mn contents on the ductility of Ti bearing hot rolled high strength steel sheets. (The development of Ti bearing hot-rolled high strength steel sheet with good cold formability--III). Yasuo Takahashi, et al. ....	S603
572	Improvement in fatigue strength of spot-welded hot-rolled high strength sheet steel joints by temper treatment. Masatoshi Shinozaki, et al. ....	S604
573	Effects of passivation on the rust resistance of ferritic stainless steel. Akio Yamamoto, et al. ....	S605
574	Effect of type of inclusion on pitting resistance of austenitic stainless steels. Yoshito Fujiwara, et al. ....	S606
575	Effect of alloying elements on weathering resistance of austenitic stainless steels. Yoshito Fujiwara, et al. ....	S607
576	Corrosion resistance of austenitic stainless steel to high temperature steam environment. Hideaki Itoh, et al. ....	S608
577	Corrosion behaviour and stress corrosion cracking of 13 % chromium steels in CO <sub>2</sub> /H <sub>2</sub> S environment. Hayao Kurahashi, et al. ....	S609
578	Polarization behavior of high-alloy steels for OCTG in high temperature, high-pressure environment. Shuji Hashizume, et al. ....	S610
579	Corrosion behavior of high-alloy steels for OCTG in high temperature, high pressure CO <sub>2</sub> environment. Katsumi Masamura, et al. ....	S611

580	Mechanical properties of 25 % Cr duplex stainless steel welds. (Study on 25 % Cr duplex stainless steel--I). Masashi Koso, et al. ....	S612
581	Corrosion resistance of 25 % Cr duplex stainless steel welds. (Study on 25 % Cr duplex stainless steel--II). Hideaki Miyuki, et al. ....	S613
582	Roll forming of small diameter stainless pipe. Kazuhiro Uozumi, et al. ....	S614
583	On the ridging of Nb containing ferritic stainless steel sheets. (Development of low C-17Cr-Nb, Cu stainless steel sheets--V). Masao Koike, et al. ....	S615
584	Effect of Ni content on the mechanical properties of 13Cr-Ni cast steel. Yoshitaka Iwabuchi, et al. ....	S616
585	Direct quenching of martensitic stainless steels. Ken-ichi Tsunakawa, et al. ....	S617
586	Effects of alloying elements and processing on the formation of delta ferrite in martensitic 12 % Cr Mo V steel. Hideyuki Kawamoto, et al. ..	S618
587	Improvement of hot workability in continuously cast austenitic stainless steel. Masanori Ueda, et al. ....	S619
588	Manufacturing technology and material properties of 347 stainless steel flange forging. (Study on manufacturing technology of heavy stainless steel--III). Hisashi Kaga, et al. ....	S620
589	Manufacturing technology and material properties of 304L stainless steel disc forging. (Study on manufacturing technology of heavy stainless steel--IV). Ikuo Sato, et al. ....	S621
590	An investigation on powder metallurgy of austenitic stainless steel. Akihiro Tani, et al. ....	S622
591	The influence of phosphorus content and boron addition on tempered martensite embrittlement in medium-carbon high strength steel. Yoshio Namba, et al. ....	S623
592	Mechanical properties and microstructures of low alloy steels on rapid tempering. (Tempering properties of low alloy steels--II). Terutaka Tsumura, et al. ....	S624
593	Effect of the degree of temper embrittlement on the susceptibility of hydrogen embrittlement. (Temper embrittlement and hydrogen embrittlement of Cr-Mo steel--II). Jun Furusawa, et al. ....	S625
594	The relation between hydrogen embrittlement and temper embrittlement of 2.1/4Cr-1Mo steels. Nobuo Totsuka, et al. ....	S626
595	Susceptibility of hydrogen embrittlement in temper-embrittled Cr-Mo steels. Toshio Takano, et al. ....	S627
596	Characteristics of acoustic emission for intergranular pop-in cracking and elastic-plastic fracture toughness in Cr-Mo steel. Keiichi Shimomura, et al. ....	S628
597	Effect of Ni amount on COD characteristics of weld heat-affected zone. (Development of steel plates for low temperature service with improved COD value in weld fusion zone--III). Takao Horiya, et al. ....	S629
598	Fracture toughness of layered steel with different toughness level. (Development of steel plates for low temperature service with improved COD value in weld fusion zone--IV). Makoto Shibasaki. ....	S630
599	Evaluation of COD in CT specimen. Shinji Konosu, et al. ....	S631
600	Strain rate sensitivity of fracture toughness in 9 % Ni steel. Ken-ichi Sano. ....	S632
601	Neutron irradiation embrittlement of iron alloys. Naohiro Igata, et al. ....	S633
602	Phenomenological theory on He embrittlement of Hastelloy X. Katsutoshi Watanabe, et al. ....	S634
603	Properties of 2.1/4Cr-1Mo steel pipes manufactured by UOE process. Kazuyoshi Ume, et al. ....	S635
604	Property of arctic grade line pipe on MIG-SAW process. Hiroyoshi Majima, et al. ....	S636
605	Study on welded layer of ERW pipe. (Change of chemical compositions in white layer--I). Toshihiro Takamura, et al. ....	S637
606	Fundamental study for development of Si-Mn type steel for low temperature service under large heat input welding condition. (Study for improvement of toughness of the heat-affected zone of welded Si-Mn type steel for low temperature service--I). Yokimi Kawashima, et al. ....	S638
607	Development of Si-Mn type steel for low temperature service under large heat input welding condition. (Study for improvement of toughness of the heat-affected zone of welded Si-Mn type steel for low temperature service--II). Yoshihiro Okamura, et al. ....	S639
608	Development of the new reinforcement for concrete utilizing the leavings of wires for steel wool. Akira Yanagisawa, et al. ....	S640
609	Characteristic properties of bond zone of the clad steel plate by a hot rolling process. Tsuyoshi Nakamura, et al. ....	S641
610	Welding of Cu alloy clad steel plate and its corrosion resistance. Minoru Miura, et al. ....	S642

---

611	Estimation of oxide-induced crack closure on the basis of fatigue crack threshold of stainless steels. Saburo Matsuoka, et al. ....	S643
612	Influence of test atmosphere on the fatigue crack propagation and fracture mode of steels. Chitoshi Masuda, et al. ....	S644
613	Multiple regression analysis between fatigue crack growth rates of 80-120 kgf/mm <sup>2</sup> grade steels in seawater and chemical compositions of them. Norio Maruyama, et al. ....	S645
614	Micro and macro fatigue crack propagation in structural steels. Chikayuki Urashima, et al. ....	S646
615	Low cycle fatigue of carbon steel in high temperature water environment. Makoto Higuchi, et al. ....	S647
616	Fatigue crack propagation behavior of steels for nuclear pressure vessels in BWR environment. Shigeto Matsumoto, et al. ....	S648
617	Effect of carbides on the thermal fatigue crack propagation in high chromium cast iron. Shoji Tokushige, et al. ....	S649
618	Properties of compacted vermicular graphite iron--the growth due to thermal cycling, fatigue life and fracture toughness at elevated temperatures. Toshinori Yokomaku, et al. ....	S650
619	Influence of creep damage on high-temperature fatigue life for Cr-Mo-V steel. Junro Kyono, et al. ....	S651
620	High-temperature, low-cycle fatigue properties of chromium-molybdenum alloy steel plate SCMV3-NT. Kenji Kanazawa, et al. ....	S652
621	Effect of creep damage on rupture life for SUS316 steel under combined creep-fatigue loading. Koichi Yagi, et al. ....	S653
622	Mean strain effects on low cycle fatigue properties at elevated temperature for FBR structural materials. Isamu Nonaka, et al. ....	S654
623	Low cycle fatigue properties of Ni-base superalloys at elevated temperatures. Hirokazu Tsuji, et al. ....	S655
624	Mechanism of ferrite grain refinement in normalized high N-V steels. (Development of low carbon equivalent and high N-V HT-50 steel plates--I). Toshiei Hasegawa, et al. ....	S656
625	Development of high N-V type low Ceq HT50. (Development of low carbon equivalent and high N-V HT-50 steel plates--II). Kouichi Uchino, et al. ....	S657
626	Effect of boron on the hardenability of HT80 steels in rapid heating. Kunihiko Kobayashi, et al. ....	S658
627	Effect of austenitizing condition on the strength and toughness of rapidly heated steels. Yasufumi Fujishiro, et al. ....	S659
628	Development of grade U-100 and U-80 line pipes heat treated by induction heating. Izumi Takeuchi, et al. ....	S660
629	Effects of sulfur on the AlN precipitation behavior of in situ melted and solidified low C steels. Kohsaku Ushioda, et al. ....	S661
630	Hot deformation simulator for continuous rolling. (Development of control technique of properties by steelmaking and hot rolling processes--I). Takaaki Nakamura, et al. ....	S662
631	Effect of warm rolling in $\alpha$ -phase region on strength and toughness of as-rolled steels. Masakazu Niikura, et al. ....	S663
632	Influence of rolling deformation types on the toughness of shape steel. Hiroshi Kubo, et al. ....	S664

---