

History of Technology

		Steel							Others
		Raw Material/Ironmaking	Steelmaking	Plate	Flat Products	Bar and Shape Steel	Pipe	Stainless Steel/Titanium	
1950–	1954 1957 1958– 1959–	Self-fluxing sinter making technology Larger blast furnace, higher pressure, O ₂ enriching, high-temperature blast technology		Aluminum killed steel HT-50 manufacturing technology (WEL-TEN®50) High-strength 60K steel for welding (WEL-TEN60) COR-TEN®			High-strength rail HH		
1960–	1960 1962 1963 1964 1965 1966 1967 1969	Automation of material yard, sinter, hot blast stove, etc.	 Converter exhaust gas non-combustion recovery technology Molten iron desulfurization technology KR Special steel refining with LD converter Vacuum degassing technology Converter computer control technology	Introduction of heat treatment technology Corrosion-resistant 50K steel (YAWTEN 50) Weldable high-strength 80K steel (WEL-TEN 80) N-TUF type low-temperature steel WEL-TEN100 High heat input welding for shipbuilding Low-temperature (50K) steel 9% nickel steel Completion of weldable high-strength steel WEL-TEN series EDP of plate process control N-TUF _{CR} 196 (5.5% Ni steel) Introduction of BURB technology Introduction of CR rolling technology	 Can Super® Anti-white-rust galvanized sheet Hot-dip galvanized sheet Silver Alloy® Hot rolling roll chock rearrangement equipment	 DP wire (rod) for high-carbon wire drawing U-type, Z-type steel sheet pile Super giant H-shape	Large-diameter spiral linepipe		
1970–	1970 1971 1972 1973 1974 1975 1976 1977 1978	 Blast furnace heavy oil volume injection technology Dismantling inspection of blast furnace Larger coke oven and higher operation rate technology Environmental improvement technology (COG desulfurization, SSD dust handling) Heated briquette blend coking technology Blast furnace oil-less operation technology Waste energy recovery technology CDQ, TRT, etc.	 Total continuous casting technology Establishment of dynamic operation technology in converter steelmaking method (commended by President, won Okochi Memorial Foundation Production Prize) Variable width of continuous casting Continuous casting electromagnetic stirring technology Vacuum degassing RH light processing technology	Practical use of steel plate for zinc oven (NAGP®) HT50, 60 for Zn plating Ultra-heavy large unit weight steel plate manufacturing technology Differential thickness steel plate Seawater-resistant steel MARILOY® series Practical use of steel for reactor containment vessel Taper steel plate Ultra-heavy low-alloy steel for reactor pressure vessel Highly weldable 60K steel (WEL-TEN60-CF) X70 for line pipe Anti-lamellar tear steel plate for marine structure Plate marking automation equipment	Automation and energy-saving technology for hot strip mill Extra-deep-drawing steel plate SSPDX “Development of new directional silicon steel sheet ORIENTCORE HI-B®” won the Okochi Memorial Foundation Prize Hot rolling heating furnace computer control technology “Manufacturing method of high magnetic flux density – directional silicon steel sheet” won Imperial invention award Cold-rolling mill computer control technology “Development of manufacturing technology of deep drawing sheet with sheet continuous annealing equipment” won the Okochi Memorial Foundation Prize DIS tin for two-piece can Cold-rolled high-strength steel sheet for press One-side galvanized sheet Hot rolling high-speed high-pitch rolling technology	 Universal box 100K high-tension chain Wire for steel cord	X-65 spiral linepipe for cold region YUS steel pipe for exhaust High-class linepipe using heat-treated steel sheet X70 UO linepipe “Manufacturing method of prefabricated cell bulkhead” won National Invention Award, the prize of Director-General of the Science and Technology Agency Low-alloy high-class electric welded tube for boiler tube		

		Steel							Others
		Raw Material/Ironmaking	Steelmaking	Plate	Flat Products	Bar and Shape Steel	Pipe	Stainless Steel/Titanium	
1970-	1979	Coke oven flame gunning repair technology		Titanium type tough high-strength steel plate VEGA welding method (1 electrode)	“Development of pollution-free chemical conversion technology by means of tannic acid of galvanized steel” won the Ichimura Industrial Prize Hot-rolling intermediate stand rolling technology Shape control technology with 6-heavy rolling mill NHM, HNH	Wire NHF® omitting process for cold forging	Medium-diameter seamless steel pipe for oil well pipe by press roll punching method		
1980-	1980		Steelmaking-rolling direct process V operated in Oita Continuous-cast new type CGC steel	Practical use of ultra-heavy HT 80 steel for rack			“Development of manufacturing method of new seamless steel pipe by industrializing press roll piercing method” won the Okochi Memorial Foundation Prize Reliable electric resistance welded steel pipe manufacturing technology Anti-high-pressure crush oil well pipe Large square pipe manufacturing method by roll forming method and development of the equipment” won the Okochi Memorial Foundation production Prize Low carbon bainite high-strength linepipe	Titanium manufacturing start	Becoming “a general material maker” by changing the Articles of Incorporation
	1981	Blast furnace life prolonging technology Blast furnace block-like band observing technology	Slag-minimum converter refining technology	50K class high-tensile plate (CLC®) by new process (commended by President) Plate high-yield rolling technology High P type corrosion-resistant steel	“Development of corrosion-resistant steel for hot dipping oven” won Ichimura Industrial Prize TFS deposition can material for hot pack/retort High-performance flash-butt welder NMW for strip Announcement of development of “Exelte®” (commended in 1985 by President) Establishment of “Zinclite®” manufacturing technology (commended by President)	High-strength rail NHH Soft heat treatment omitting technology			
	1982	Charging technology by material grain for blast furnace Formed coke manufacturing technology	Converter composite blowing method combining upper-bottom blowing CC defect-free cast metal manufacturing technology aiming at direct hot rolling	New temperature-controlled rolling method NIC process 100t ingot rolling technology	Proposal of preheat estimating method (CEN method) CLC process introduction Proposal of hardness estimation formula (Yurioka’s formula) Discovery of transgranular transformation core of weld metal (TiB type) SESNET welding method				
	1983		Converter composite blowing method (commended by President) “Development of steelmaking – rolling direct process” won the Okochi Memorial Foundation Prize	Steel for HIC-resistant pressure vessel	Development of directional silicon steel sheet of very low iron loss by laser irradiation (commended by President, won the Okochi Memorial Foundation technology Prize)				
	1984		New steelmaking process by hot-metal preliminary processing method (commended by President, won the 1985 Okochi Memorial Foundation production Prize)	Practical use of electromagnetic plate		High-strength, tough wire (rod) (DLP®) (commended by President)			
	1985			1.5% Ni steel 50K steel for EBW	New corrosion-resistant steel sheet for automobile (Welcote N) (commended by President) “Silver Alloy E®” (commended in 1989 by President) High-strength hot-rolled steel sheet (Dual Phase HI-TEN) (commended by President) “Development of accurate/flexible production technology in large-scale hot-rolling mill” (scale-free rolling technology)” won the Okochi Memorial Foundation Prize				
	1986	Large-capacity lava flame technology for iron/steel kiln (commended by President, won the 1985 Okochi Memorial Foundation Prize) “Development of steel superior in joint toughness utilizing new transformation mechanism” won the Ichimura Industrial Prize Practical use of H-type TD		Differential thickness corrugated steel plate manufacturing technology (Award in 1986 by President)	Joint CTOD guaranteed TiO50K steel for marine structure Structural TMCP steel (BT-HT325, 355) (commended by President) Low-hardness 60K steel (WEL-TEN® 60, 62-SCF)	In-line heat-treated rail DHH	Steel pipe for door impact beam		
	1987	Practical use of center segregation improving technology (CORD) by split roll reduction							
	1988	Practical use of converter type hot-metal preliminary processing method (LD-ORP) Highly tough steel for welding (commended by President) Face reduction type center segregation improving technology (SEFT)			Accurate/efficient steel plate rolling method by roll pair/cross system (commended by President, won the 1996 Okochi Memorial Foundation production Prize) New high-performance galvanized steel sheet (Alsheets®) (commended by President) Material for press of good workability “hot-rolled BH steel sheet” (commended in 1989 by President)	“Development of high-strength/tough wire” won the Ichimura Industrial Prize		Announcement of direct hot-rolling extrusion technology omitting blooming of stainless steel (commended in 1987 by President, won the Okochi Memorial Foundation production Prize)	
				Fire-resistant steel for steel frame building (FR steel) (commended in 1990 by President)					

		Steel							Others
		Raw Material/Ironmaking	Steelmaking	Plate	Flat Products	Bar and Shape Steel	Pipe	Stainless Steel/Titanium	
1980-	1989	Iron ore sintering method of grain segregation control type (commended by President, won the Okochi Memorial Foundation Production Prize)		Earthquake-proof weldable steel for building (BUIL TEN ®) (commended by President)					
1990-	1990			Low YP steel for building (LYP100, 125) Joint CTOD (-10°C) guaranteed YP420 steel for marine structure Low YR60K steel for building steel pipe pillar	Material for container "Can Light ®" (commended by President) Highly functional vibration control steel plate (commended by President) Steel plate for deep sea boat (commended by President)	"Development of highly efficient free-size rolling technology for H-beams" won the Okochi Memorial Foundation Production Prize			
	1991			Introduction of finishing rolling pair cross technology (won the 1996 Okochi Memorial Foundation Production Prize)	Announcement of development of "TRIP steel" (commended in 1991 by President, won the 1999 Okochi Memorial Foundation Production Prize)		Manufacturing technology of high-class electric resistance welded tube of non-temper type for oil well (commended by President, won the 1991 Okochi Memorial Foundation Production Prize)		
	1992	Pulverized coal agglomeration method		Introduction of finishing rolling shift mill technology			X80 linepipe		"Development of corrosion diagnosis technology of structures by the electrochemical measuring method" won the Ichimura Industrial Contribution Prize
	1993		Non-temper steel for hot forging of tough ferrite/pearlite type (commended by President) Practical use of cold iron source melting process (SMP) Practical use of RH multi-function burner (RH-MFB)	Practical use of resin vibration control steel plate One-side 4 electrodes SAW welding system (FCuB)	"Directional silicon steel sheet of very low iron loss by laser irradiation" won National Invention Award, Invention Prize of Chairman of the Federation of Economic Organization Hot-rolled HSS roll by continuous tinkering method (commended by President, won the 1997 Okochi Memorial Foundation Production Prize)	3600MPa class steel cord wire (commended by President)			
	1994	Technology to use lots of limonite type ore (RCX method) (commended by President)		Deposition strengthening type preheat reduction HT80	Deposition strengthening type preheat reduction HT80	Method of building underground continuous wall made of steel (NS-BOX) (commended by President)			
	1995		Slab electromagnetic stirring (commended by President) Practical use of MURC method Practical use of in-mold uniform electromagnetic brake (LMF)	Main line one operation (labor-saving technology) Ultra-heavy HT100 for penstock	Practical use of highly lubricant GA-L processed steel plate	1800, 2000 MPa class wire for bridge (commended by President) "Web width widening rolling technology of H-shape steel by skew roll mill" won the National Invention Award, prize of the chairman of Japan Patent Attorneys Association	X100 linepipe		NOMST (direct advancing and direct reaching method of shield) (commended by President)
	1996	"Low-cost and environmentally friendly coke making technology for ironmaking" won the Okochi Memorial Foundation Production Prize		2-electrode VEGA welding method Announcement of development/practical use of HAREST ® steel plate manufacturing process (1998 National Invention Award, commended in 1999 by President) Compact strand (CS) New corrosion-resistant steel for stack (WELACC®5)	"Heat-resistant domain control technology of directional electrical steel sheet" won the Ichimura Industrial Contribution Prize	"Development of super high tension steel wire for bridge" won the Ichimura Industrial Contribution Prize			
	1997						Linepipe for deep sea		NM segment (commended by President)
	1998		Practical use of Muroran NCR process Practical use of dual drum type strip CC (STC)	Development of low-temperature transformation welding material Multistage LP steel plate Low YP steel for building (LYP235) Practical use of beach corrosion resistant steel, announcement of marketing (commended in 1999 by President, won the 2000 Ichimura Industrial Contribution Prize)	"Zinkote ® 21" was announced				
	1999	"Sintering technology of environmental harmony type for difficult-to-process iron ore source" won the Okochi Memorial Foundation Production Prize		Welding distortion reducing technology	"Silver Zinc ® 21" was announced		Development and full-fledged selling of rotary press-in steel pipe pile "NS Ecopile ®"	Hot-rolled titanium clad hot-rolled steel sheet was adopted for the road across the Tokyo Bay, and the development won the Ichimura Industrial Contribution Prize	
					"Development of titanium clad hot-rolled steel sheet" won the Ichimura Industrial Contribution Prize 0.19mm ultra-thin tinplate won the Technology Development Prize of Japan Institute of Metals TRIP steel type sheet for automobile won the Okochi Memorial Foundation Production Prize				

		Steel						Others	
		Raw Material/Ironmaking	Steelmaking	Plate	Flat Products	Bar and Shape Steel	Pipe	Stainless Steel/Titanium	Others
2000-	2000			Joint CTOD (-10°C) guaranteed YP500N steel for marine structure High HAZ toughness control deoxidation technology (HTUFF®)	High corrosion-resistant new plated steel plate "Superdyma®" Epochal work roll for cold rolling World-first "high hole expansibility 80kg class HTSS" Starting the sale of new plated steel plate "Superdyma" of high corrosion-resistance				Next-generation ceramics "NEXCERA"
	2001			Heavy EH40 steel for container ship TMCP type LP steel plate Success in developing high HAZ tough steel to cope with large heat input for building skeleton	Development/practical use of world-first endless hot-rolling process won the Okochi Memorial Foundation Production Prize	"Invention of rail of wear-resistance and resistance against internal fatigue damage for heavy railroad" won the National Invention Prize		Ultra-high workability ferrite type stainless steel sheet "YUSPDX®"	Wafer batch mounting type microball bumping technology
	2002	Waste plastic recycle into chemical raw material using coke ovens" won the WESTECH Prize 2002 (Environment Minister Prize)		NT type V-ModCr-Mo steel plate HTUFF steel won the Premium Supplier Prize	Automobile seat parts 100kg class cold-rolled steel plate HTSS Steel house "NSF method" (commended by President) Chromate-free electro-galvanized steel plate "Zinkote21" was rapidly adopted "High heat-absorbing steel plate" that efficiently radiate heat inside electric apparatus 40/45 kg class high-tensile steel sheet adopted for automobile side panel, first in the world Electrical sheet manufacturing technology won the special prize of "Tokyo Creation Prize"	Rail for high-speed railroad New method "underground continuous wall made of soil-cement steel"	X120 linepipe Tough-Ace® 24" ERW flexible forming Practical use of rotary press-in method "gyro press method" of steel sheet pile with tip bit	Color clear coated stainless steel sheet, adopted for refrigerator	
	2003	"Recycling method of plastics including chlorine utilizing coke oven for ironmaking" won the National Invention Prize		Introduction of powerful cold leveler Joint CTOD (-40°C) guaranteed 50K, 60K steel for marine structure Introduction of new leveler (OPL) of "new anti-corrosion steel" for tanker bottom plate Highly weldable/high-performance 60K steel for building structure Weld zone tough steel (HTUFF®) won the Ichimura Industrial Contribution Prize Super 9% Ni steel	Marketing of "Antistatic Viewkote®" to prevent occurrence of static electricity Improvement of thin efficient electrical steel sheet menu to contribute to energy-saving Practical use of world-first 60K class/80K class TRIP alloyed welding galvanized steel plate (GA-TRIP)				New method "MS coupling caisson method"
	2004			New S-TEN1 won the Nikkei Good Product/Service Prize	"Research on structural material prediction control/generating technology of steel sheet" won the Prize of Minister of Education, Culture, Sports, Science and Technology	Hat Type Sheet Pile 900		Titanium roof adopted for Ikkyuji temple and Kinkakuji temple tea-ceremony room (2003 Good Design Prize, 2004 Otani Museum Prize) Titanium anti-discoloration technology won the Development Prize of The Japan Institute of Metals	Japan-first SOFC fuel cell power generating system developed with Sumitomo Corporation
	2005		Practical use of fine grain iron source through melting process (RHF-DSP)	Introduction of new CLC® (CLC-μ) technology Introduction of UIT technology	"Development of high-formability anti-corrosive steel sheet for automobile" won the National Invention Prize Discontinued manufacturing of "chromate treatment" of electrogalvanized steel sheet for automobile, electric and OA sectors		Continuous butt-welded tube for flare forming Practical use of end-enlarging foot protection sheet pile method "TN-X method" Stepped butt-welded tube	Titanium sheet was adopted for body exterior of digital camera made by Canon Titanium alloy "Super-TIXR51AF" was adopted for Dunlop "ALL NEW XXIO" National Grand Theatre in Beijing adopted the titanium construction material. Chrome type deformed bar of Nippon Steel & Sumikin Stainless Steel Corporation acquired the certification by Minister of Land, Infrastructure and Transportation, first in the industry.	Two items of our company's recycle technology won the Prize of "Ai/Chikyu (love/earth)" 5000 type aluminum alloy for high-temperature forming won the "highest award" of Nikkei Good Product/Service Prize
	2006			ARU-TEN®					Nippon Steel Chemical Co., Ltd. succeeded in developing new green organic EL material and won the "High-tech Measuring/Analysis Technology/Equipment Development Prize" of The Japan Society for Analytical Chemistry Nippon CTL Technology Research Association was established

		Steel						Others	
		Raw Material/Ironmaking	Steelmaking	Plate	Flat Products	Bar and Shape Steel	Pipe	Stainless Steel/Titanium	Others
2000-	2007	“Development of thin-wall, refractory integral type stove for large blast furnace” won the Prize of Minister of Education, Culture, Sports, Science and Technology		High-strength steel plate for ship won “2006 Nikkei Good Product/Service Prize, highest award, Prize of Nihon Keizai Shimbun” “IT operation support system” won the Nikkei Product-Making Prize “Development of new S-TEN®1, sulfate-resistant steel that remarkably improved resistance against hydrochloric acid” won the Ichimura Industrial Contribution Prize	Development/practical use of environment-friendly steel sheet “Ecokote®-S” for automobile fuel tank	“Rail highly resistant to wear and internal fatigue damage for heavy-haul railroad” won the Product-Making Prize of the Minister of Economy, Trade and Industry		Titanium roof material of Hozomon, Sensoji temple, won the Prize of Otani Museum. Titanium alloy for automobile won the first Application Development Prize of American Titanium Association	High-quality 100 mm diameter silicon carbide single crystal wafer Nippon Steel Materials Co., Ltd. developed “new Cu bonding wire” Nippon Steel Materials Co., Ltd. developed new type catalyst material for exhaust gas purifying “Manufacturing of large-diameter silicon carbide (SiC) single crystal wafer with less internal defect” won the Nikkei BP Technology Prize
	2008	SCOPE type coke oven “Development of diagnosis/repair technology under ultimate environment that realized refreshing of coke oven” won the Okochi Memorial Foundation Production Prize		HT120 for construction machinery “47K high-strength steel plate” won the Okochi Memorial Foundation Production Prize High corrosion-resistant steel plate for crude oil tanker “NSGP-1®” won 2007 Nikkei Good Product/Service Prize High yield strength steel YP400, 500, 700N steel for building structure for Tokyo Sky Tree	“Self-cleaning Viewkote®” having cleaning function by means of rainwater was adopted for ENE FARM and Eco-Cute outdoor unit “Compact type hydro-forming equipment” won the Invention Prize of National Invention Award		Development of highly rigid and durable joint “Super Junction” used for sheet pile foundation. It was adopted for extension work of Haneda Airport.	Nippon Steel & Sumikin Stainless Steel Corporation succeeded in developing the commodity of air-conditioner connecting piping made of stainless steel, first in the world. Stainless steel deformed bar of Nippon Steel & Sumikin Stainless Steel Corporation was adopted for the foundation of Tochoji temple/five-story pagoda.	
	2009	“Development of ironmaking dust recycle process using rotary hearth type reducing furnace” won the 56 th Okochi Memorial Foundation Production Prize	Starting-up of environment harmony type slug processing equipment (Nagoya)	High-strength steel SBHS500, 700 for bridge “Development of corrosion-resistant steel plate NSGP-1 for VLCC” won the 2008 Invention Improvement Award President Prize “Development of plate CLC- μ process” won the 2008 Invention Improvement Award President Prize High-deformability steel (NS-Ship-Safety 235)	“Development of touchup welding material for high corrosion-resistant galvanized sheet” won the Technology Prize (prize for encouragement) of Japan Welding Society and “welding wire and welding method” won the Invention Prize for Attention “EcokoteS” won the Ichimura Industrial Contribution Prize and Product-Making Prize of Prime Minister Development/practical use of hot-rolled GA Hi-Ten of high burring type New environment-friendly black electro-galvanized steel sheet “Zinkote® Black” was adopted for thin type TV made by Panasonic	“Development of Hat Type steel sheet pile 900” won the 2008 Invention Improvement Award President Prize	Steel pipe pile of low noise, low vibration and highly supporting power “RS Plus ®”		Nippon Steel Chemical Co., Ltd., Osaka University/Graduate School of Engineering, and Iwatani International Corp. jointly succeeded in synthesizing “nickel particulates” by a new process using microwave
2010-	2010	“Invention of hot measuring/predicting technology for repairing coke oven wall brick” won the National Invention Prize, the Prize of Minister of Education, Culture, Sports, Science and Technology		6% Ni steel for LNG tank			High-deformability line pipe	Haneda Airport runway D adopted titanium cover plate. Nippon Steel & Sumikin Stainless Steel Corporation developed world-first epochal stainless steel “FW series” by adding Sn. Titanium alloy for muffler of automobile/two-wheeler won the Technical Development Prize of Japan Institute of Metals The tile roofing of Sensoji temple main hall using our company’s titanium material was completed (won the 2010 Otani Museum Prize).	Nippon Steel Chemical Co., Ltd. developed new UV thermosetting resin material “ESDRIMER®” Nippon Steel Chemical Co., Ltd. developed polymer nano composite material with ultra-fine metallic particles uniformly dispersed Our company, Nippon Steel Materials Co., Ltd. and Nippon Micrometal Corporation established a mass-production system of new type copper bonding wire (EX1).