Fatal and non-fatal accidents in tunnel construction work in Japan in 1999-2021

tunnel construction work industry Code No.030102

Type of accidents in tunnel construction work in 1999-2021

Type of accidents	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	total	Type of accidents
fall from height	24	18	30	20	14	22	21	15	22	20	13	8	6	12	10	10	5	10	10	7	13	9	9	328	fall from height
falling to same level	6	7	12	9	7	2	4	8	5	5	7	3	4	4	4	4	8	4	6	6	9	7	3	134	falling to same
crash	3	8	7	9	3	4	3	8	3	5	3		4	2	1	3	3	9	5	4	3		2	92	crash
struck by flying or falling object	32	24	26	25	14	13	25	22	9	15	12	14	9	14	9	3	13	13	13	12	10	14	7	348	struck by flying or falling object
collapse	17	17	11	18	10	6	8	10	7	7	10	5	4	8	4	8	7	11	9	8	4	2	9	200	collapse
crashed by	12	20	16	6	14	6	14	6	7	12	7	5	10	8	7	6	6	5	3	7	7	7	10	201	crashed by
caught in/between	34	32	27	17	22	20	16	17	25	19	18	12	13	12	18	9	22	12	12	15	16	23	10	421	caught in/between
cut	2	3	2	2	4	4	3	3	1	1	2	2	1	1	1	2	1	1	4			1		41	cut
injury to the sole of the foot			2										1				1							4	injury to the sole of the foot
drown																					1		1	2	drown
contact to high/low- temperature	1	2	1	1	1	1	1		3	2		2	1	4	1			1	1	2	2			27	contact to high/low- temperature

contact to harmful																									contact to
	1	7	6	8	1	6	5		2	3	1	2	1	1				1	2		6	2	2	57	harmful
substance																									substance
electric shock												2												2	electric shock
explosion		2								4				4										10	explosion
burst	1					2		1			1										1		1	7	burst
fire		1	1		1			1																4	fire
traffic accident (public	3	4	4	12	15	3	8	3	1	1	3	6	3	1	2	1		3		4		1	3	81	traffic accident
road)				12			6	3			3		3	ľ						4			3	01	(public road)
traffic accident							1																	1	traffic accident
(others)																									(others)
reaction to																									reaction to
motion/improper	4	5	4	3	2	2	4	2	1	1	2	2	4	1	2	1		2	3	3	5	4	2	59	motion/improper
motion																									motion
others		1				1	1	22				1				1	1	2	11		2	16	27	86	others
unclassifiable	1				1				1								1							4	unclassifiable
total	141	151	149	130	109	92	114	118	87	95	79	64	61	72	59	48	68	74	79	68	79	86	86	2,109	total

Causal agents (large) of fatal and non-fatal accidents in tunnel construction work in 1999-2021

Causal (L) agents	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	total	Causal (L)
eddsur (2) dgerres		2000	2001	2002	2003	2001	2003	2000	2007	2000	2003	2010	2011	2012	2013	2011	2013	2010	2017	2010	2017	2020	2021	ll l	agents
machine	40	52	41	22	31	27	22	19	20	22	16	13	17	14	14	13	13	21	18	15	12	18	9	489	machine
crane, conveying																									crane,

machine	27	26	22	25	23	19	25	20	13	16	18	13	13	11	15	7	18	11	8	16	7	15	18	386	conveying
macrime																									machine
ath or a guinmont	11	11	11	16	12		15	13	9	9	7	9		6	,		3	9	9	8		7	9	195	other
other equipment		11	11	10	12	4	13	13	9	9		9	2	6	3	4	3	9	9	0	8		9	195	equipment
to no no no no horidin as																									temporary
temporary buildings, establishments	18	20	37	26	13	16	17	20	17	18	14	10	13	20	13	10	14	8	13	6	17	14	10	364	buildings,
establistifferits																									establishments
substance, material	16	14	17	15	12	15	20	11	9	15	7	7	7	10	5	7	7	4	6	8	17	8	7	244	substance,
substance, material		14	17	را	12	13	20	' '	9													0		244	material
load	1	4	3				2	1	5		1		1	1			2	2		2	2		1	28	load
environment	27	22	18	24	15	10	13	33	11	14	14	11	7	9	8	7	9	15	14	12	10	8	5	316	environment
others	1	2		2	3	1		1	3	1	2	1	1	1	1		2	4	11	1	6	16	27	87	others
total	141	151	149	130	109	92	114	118	87	95	79	64	61	72	59	48	68	74	79	68	79	86	86	2,109	total

Causal agents (middle) of fatal and non-fatal accidents in tunnel construction work in 1999-2021

Causal (M) agents	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	total	Causal (M) agents
engine												1												1	engine
power transmission mechanism							1					1												2	power transmission mechanism
woodworking machine	1	1	1	1	2	4	2	1	1	1			1	1	1			2	2					22	woodworking machine

construction machine	32	44	35	19	29	21	18	17	14	18	13	10	14	10	12	11	12	19	13	15	10	17	9	412	construction
																									machine
metal manufacturing																									metal
machine	1	1									2		2						1		1	1		9	manufacturing
																									machine
general machine	6	6	5	2		2	1	1	5	3	1	1		3	1	2	1		1		1			42	general
									1					1											machine
mobile silviculture																									mobile
machine																			1					1	silviculture
																									machine
crane	5	7	9	3	5	6	5	8	3	5	1	2	3	2	4	1	6	3	3	2	3	3	5	94	crane
conveying machine	21	17	9	18	11	10	12	9	9	9	17	6	9	9	10	4	12	5	5	10	4	11	10	237	conveying
, ,																									machine
vehicle	1	2	4	4	7	3	8	3	1	2		5	1		1	2		3		4		1	3	55	vehicle
pressure vessel	1				1							1											1	4	pressure vessel
chemical facilities																									chemical
Chemical facilities																									facilities
uslding aguinment	1	1			1	1																			welding
welding equipment						ľ																		4	equipment
kiln, caldron																									kiln, caldron
																									electric
electric equipment								I				2											1	5	equipment
human power machine,																								F.0	human power
tools	6		1	7	2		3	2	3	4	3	2	2	<b> </b>	1	1	1	1	2	2	2	2	2	50	machine, tools

tools	2	7	5	5	7	2	8	7	4	5	4	3		5	2		1	6	3	4	5	3	3	91	tools
other equipments,	1	3	5	4	1	1	4	3	1			1				3	1	2	4	2	1	2	2	41	other equipments, facilities
temporary buildings, establishments	18	20	37	26	13	16	17	20	17	18	14	10	13	20	13	10	14	8	13	6	17	14	10		temporary buildings, establishments
hazards, harmful substances		3	4	7	1	6	5	1	2	6	1	2		7				1			2	2	3	53	hazards, harmful substances
materials	16	11	13	8	11	9	15	10	7	9	6	5	7	3	5	7	7	3	6	8	15	6	4	191	materials
load	1	4	3				2	1	5		1		1	1			2	2		2	2		1	28	load
natural environment	27	22	18	24	15	10	13	33	11	14	14	11	7	9	8	7	9	15	14	12	10	8	5	316	natural environment
other causal agent	1							1			1	1						2	9		2	15	27	59	other causal
no causal agent		2		1	2	1			2	1	1		1	1			2	2		1	4	1		22	no causal agent
unclassifiable				1	1				1						1				2					6	unclassifiable
total	141	151	149	130	109	92	114	118	87	95	79	64	61	72	59	48	68	74	79	68	79	86	86	2,109	total

Causal agents (small) of fatal and non-fatal accidents in tunnel construction work in 1999-2021

Causal (S) agents	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	total	Causal (S) agents

engine									1												1	engine
power transmission mechanism				1					1												2	power transmission mechanism
circular sawing machine		1	2	2	1	1	1					1			2	2					13	circular sawing machine
band sawing machine																						band sawing machine
wood planer machine											1										1	wood planer machine
hollow chisel mortiser, wood borer																						hollow chisel mortiser, wood borer
chamfering machine, router, woodworking milling machine																						chamfering machine, router, woodworking milling machine
chain saw																						chain saw
other woodworking machines										1											1	other woodworking machines
leveling, transporting or loading machine			3	1	1	2	1	1	1		1		1	2	5		1		1		21	leveling, transporting or loading machine
excavating machine		12	4	6	5	1	6	2		3	3	5	4	6		2	5	3	1	2	70	excavating machine
foundation work machine			3			1								1			1		2	1	9	foundation work

			 $\vdash$	 	1				-	-			1	-		1		1			-	
hardening machine										2					1						3	hardening machine
demolition machine		3	2	1		2	1		3			1		1	1	1	1	2		1	20	demolition machine
vehicle for high lift work		1	2	1	3	1	1	3				2			1	1	1	2	3	1	23	vehicle for high lift work
other construction machines		19	15	9	8	7	9	7	6	9	6	4	6	2	11	9	6	3	10	4	150	other construction machines
lathe																						lathe
drill press, milling machine																						drill press, milling machine
grinding machine, buffing machine										1						1			1		3	grinding machine, buffing machine
power press																						power press
forging pressure																						forging pressure hammer
shearing machine																						shearing machine
other metal manufacturing machines								2		1								1			4	other metal manufacturing machines
centrifugal machine																						centrifugal machine
mixer, grinder		3		1		4	1		1		1					1					12	mixer, grinder
roll machine (except printingroll machine)													1								1	roll machine (except printingroll machine)
injection molding																						injection molding

machine																						machine
food manufacturing																						food manufacturing
machine																						machine
printing machine																						printing machine
industrial robot																						industrial robot
other general		2			1	1	2	1			2	1	1	1				1			13	other general
felling machine																1					1	felling machine
mobile logging																						mobile logging
machine																						machine
skyline yarding																						skyline yarding
machine																						machine
other mobile																						other mobile
silviculture machine																						silviculture machine
crane		1	2	2	2	1		1	1			1		1	1	2			1	3	19	crane
mobile crane		7	2	2	6	2	4		1	2	2	3	1	5	1	1	2	2	2	2	47	mobile crane
derrick crane																						derrick crane
elevator, lift															1						1	elevator, lift
cargo lifting																						cargo lifting
appliance																						appliance
gondola																						gondola
lumberyard																						lumberyard
equipment, logging																						equipment, logging
cableway																						cableway

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simple skyline yarding equipment																							simple skyline yarding equipment
other powered crane	1		1		1			1			1								1			6	other powered crane
truck	4		8		6	5	6	4	13	5	7	7	7	4	7	3	3	6	2	5	5	107	truck
forklift																					1	1	forklift
railway equipment	2				2	3	2	3	2		1	1	2		5		1	2	2	2	3	33	railway equipment
conveyor			3		4				1	1						2	1	1		2		15	conveyor
loader																				1		1	loader
straddle carrier																							straddle carrier
rough terrain hauler								1												1	1	3	rough terrain hauler
other powered conveying machines	3					1	1	1	1		1	1	1					1				11	other powered conveying machines
cars, bus, motorcycle	4		7		8	3	1	2		5	1		1	1		3		4		1	3	44	cars, bus, motorcycle
railway vehicle														1								1	railway vehicle
other vehicles																							other vehicles
boiler																							boiler
pressure vessel			1							1											1	3	pressure vessel
other pressure vessels																							other pressure vessels
chemical facilities																							chemical facilities
gas welding																							gas welding

equipment																						equipment
arc welding equipment			1																		1	arc welding equipment
other welding equipment																						other welding equipment
kiln, caldron																						kiln, caldron
industrial dryer																						industrial dryer
other kiln, caldron																						other kiln, caldron
transmission					1																1	transmission
electric power facilities						1			2												3	electric power
other electrical equipment																				1	1	other electrical equipment
human power cranes					2		1		1		1	1				1				1	8	human power cranes
human power hauling equipment			1	1		2	1											1		1	7	human power hauling equipment
human power machine																						human power machine
hand tool		1	1	2		1	2	3	1	2			1	1	1	1	2	1	2		22	hand tool
ladder		3	2	3	2	3	2	1	1		2	1			4			4	1	1	30	ladder
slinging tool			1	3			1	3	1		1			1		1			1		13	slinging tool
other tools		2	4	2	5	1	2		1		2	1			2	2	4	1	1	2	32	other tools
other equipment,																						other equipment,

facilities		5	1	4	3	1			1				3	1	2	4	2	1	2	2	32	facilities
scaffolding		4	3	2	2	2	4	1	1	5	3		2		2	2		2		1	36	scaffolding
timbering		9	2	3	2	2		1		1	6	3		5	1	2	2	1		3	43	timbering
stairs, landing stage		2			1	2	1	3			2	1		2	1	1				1	17	stairs, landing stage
opening		2		2	1	1	1				2		1			2	2	1	1		16	opening
roof, beam, haze, crossbeam, principal rafter						1		1													2	roof, beam, haze, crossbeam, principal rafter
working platform, boot board		4	4	2	3	1		2	1	1				2				2	2		24	working platform, boot board
passage		4	1	3	1		4	3	3	3	3		1	2		2	1	4	2	1	38	passage
building, establishment		7	3	4	5	5	6	2	3	2	2	6	1	1	2	4	1	4	5	3	66	building, establishment
other temporary buildings, establishments		5		1	5	3	2	1	2	1	2	3	5	2	2			3	4	1	42	other temporary buildings, establishments
explosive substance			1				2													1	4	explosive substance
inflammable substance											1										1	inflammable substance
inflammable gas							2				5										7	inflammable gas
harmful substance		1		4			1				1				1						8	harmful substance
radiation																						radiation
other hazards,		3		1	1	2	1	1	2									2	2	2	17	other hazards, harmful substances

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metal material		9		8	11	5	4	6	2	1	3	2	4	4	4	3	5	7	6	6	3	93	metal material
lumber, bamboo				1		1	1					1		2	1				2			9	lumber, bamboo
stone, sand, substance		1		2	1	2	2		1	2	1			1	1			1	1		1	17	stone, sand, substance
other materials		3			3	2		3	3	2	3		1		1		1		6			28	other materials
load		3			1	1	5		1		1	1				2		2	2			19	load
machine/equipment as load					1										2						1	4	machine/equipment as load
natural ground,		17		14	11	11	8	12	13	9	4	6	7	4	8	14	10	9	4	6	5	172	natural ground,
standing tree		1					1	1	1					2	1		3		1	1		12	standing tree
water																			1	1		2	water
abnormal environment											1			1					1			3	abnormal environment
high/cold temperature environment					1		1	1		2		3	1			1		1	1			12	high/cold temperature environment
other environments				1	1	22	1				2						1	2	2			32	other environments
other causal agent						1			1	1						2	9		2	15	27	58	other causal agent
no causal agent				2			2	1	1		1	1			2	2		1	4	1		18	no causal agent
unclassifiable				1			1						1				2					5	unclassifiable
total		149		109	114	118	87	95	79	64	61	72	59	48	68	74	79	68	79	86	86	1,595	total

Workers age of fatal and non-fatal accidents in tunnel construction work in 1999-2021

Age	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	total	Age
19 years old or less	1	1	2	1	1		1	2		2	1	2	1						1	1	1	1	1	20	19 years old or less
20-29	20	22	17	17	17	7	18	12	3	7	6	6	5	5	7	3	7	8	8	3	8	12	14	232	20-29
30-39	28	33	29	20	25	23	35	34	25	27	21	13	16	13	8	18	12	16	8	11	11	10	8	444	30-39
40-49	35	32	42	41	23	18	27	26	16	16	21	15	16	21	18	9	18	15	26	21	20	24	23	523	40-49
50-59	42	48	43	42	32	35	27	34	30	32	22	16	19	22	16	13	15	23	20	19	22	16	24	612	50-59
60 years old or	15	15	16	9	11	9	6	10	13	11	8	12	4	11	10	5	16	12	16	13	17	23	16	278	60 years old or
more													_					12				23		ll l	more
total	141	151	149	130	109	92	114	118	87	95	79	64	61	72	59	48	68	74	79	68	79	86	86	2,109	total

Workers' number of workplace of fatal and non-fatal accidents in tunnel construction work in 1999-2021

Workers scale	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	total	Workers scale
9 workers or less	27	32	31	28	34	19	18	33	21	20	19	17	14	18	15	10	17	13	24	13	18	26	16	483	9 workers or less
10-29	70	79	73	63	43	47	57	55	49	53	36	29	22	26	28	24	34	32	32	30	31	35	37	985	10-29
30-49	32	34	28	20	16	20	24	14	13	14	21	13	14	18	8	4	11	15	17	15	12	17	19	399	30-49
50-99	8	5	11	14	13	4	13	15	2	4	1	1	6	9	6	4	5	11	4	7	12	6	12	173	50-99
100-299	3	1	5	5	3	2	2	1	2	3	2	4	5	1	2	6	1	1	2	1	5	2	2	61	100-299
300 workers or	1		1							1								2		2	1			8	300 workers or
more										•															more
total	141	151	149	130	109	92	114	118	87	95	79	64	61	72	59	48	68	74	79	68	79	86	86	2,109	total

Month	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	total	Month
January	14	6	13	9	10	6	13	10	8	10	15	1	7	7	4	4	7	8	5	4	5	5	10	181	January
February	11	15	10	5	13	8	7	8	10	7	9	6	4	11	7	2	4	9	8	4	3	8	2	171	February
March	10	8	27	20	16	8	8	13	9	9	5	6	7	11	4	6	4	5	12	7	3	9	13	220	March
April	8	15	12	4	4	6	8	6	4	8	7	3	7	6	7	2	3	4	2	4	12	5	4	141	April
May	12	18	7	7	3	8	15	3	7	9	4	5	2	10	8	5	4	5	6	6	6	8	8	166	May
June	9	10	16	13	5	8	8	5	7	13	8	3	5	3	6	5	6	8	8	7	8	5	6	172	June
July	6	11	8	14	7	8	6	10	5	8	5	8	4	3	4	2	9	9	9	8	7	4	3	158	July
August	10	7	7	9	5	8	9	9	11	6	9	4	2	7	3	2	4	6	7	5	5	4	13	152	August
September	20	16	9	21	13	11	18	5	10	7	3	3	7	2	3	2	6	6	3	5	6	4	14	194	September
October	13	14	15	8	13	6	6	8	4	6	3	8	10	2	4	11	5	4	8	4	13	14	7	186	October
November	16	12	18	9	7	10	6	32	5	6	5	8	1	2	6	4	11	3	6	10	4	16	4	201	November
December	12	19	7	11	13	5	10	9	7	6	6	9	5	8	3	3	5	7	5	4	7	4	2	167	December
total	141	151	149	130	109	92	114	118	87	95	79	64	61	72	59	48	68	74	79	68	79	86	86	2,109	total

## Prefecture of fatal and non-fatal accidents in tunnel construction work in 1999-2021

Prefecture	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	total	Prefecture
Hokkaido	5	12	7		12		7	30	9	7	8	3	1	2	6	2	4	1	3	6	5	16	12	158	Hokkaido
Aomori		3			1		2		2	1			1	1				1	1		1		1	15	Aomori
lwate	10	5	7				1	3		1	3				1	5	6	8	4	4	5	3	4	70	lwate

Miyagi	1	2		1		2	4	1	1	1	1	1	1		1	1						18	Miyagi
Akita	2	2			3	3	2	1	1	1	2		1				2					20	Akita
Yamagata	3	2	2			2			3	2	2	1		1			5	1	1		1	26	Yamagata
Fukushima	2	2	3	2		3	3	6		3	1	1		4	4	3	3	2	2		2	46	Fukushima
Ibaraki	1			1	1	3	1						2									9	lbaraki
Tochigi	1	1	1		1		2	1	3	1			1		1		1					14	Tochigi
Gunma	5		5	1		2	1	1											1			16	Gunma
Saitama	2		3	1		1			1				3	3	1	3						18	Saitama
Chiba				2	6			1	1			1	1		3		2		1	1	3	22	Chiba
Tokyo	7	3	10	12	21	8	2	9	4	11	14	15	8	6	4	3	1	6	6	7	9	166	Tokyo
Kanagawa	10	8	3	2	2	4	4	4	4	3	2		2	2		4	5	8	6	3	6	82	Kanagawa
Niigata	5	5	3	9	5	3	4	6	1	2	1	2	3	1	3	2		1	1	2	2	61	Niigata
Toyama	7	2	2	2		1		1	1	1	3	1	2	2	1							26	Toyama
Ishikawa	5	2		2	3		1		1	1	1				1	1	1	2	7	3		31	Ishikawa
Fukui		1	7	2	3		1	8	2	3	2	3	3	1	1	5	15	3	7	9	14	90	Fukui
Yamanashi	1	2				1	1	1	1	1	6	4		2	3	6	3	1	1	3		37	Yamanashi
Nagano	4	3	5	5	2	1	1	3	2				2	1		1	1	6	3	1		41	Nagano
Gifu	4	5	9	2	8	7	2	1		2	1			1	6	2	2	3	2	2	6	65	Gifu
Shizuoka	7	7	18	10	10	4	4	4	3	3		3	2			3	1	2	1	1	1	84	Shizuoka
Aichi	5	1	1	2	1	2	2	5	1	5	1	5	2	2	7	1	1	1	5	5	3	58	Aichi
Mie	2	3	2	4	3	2	6	2	1	2	4	3	1	1		1		1			1	39	Mie
Shiga		2	3	2				2	1								1				1	12	Shiga
Kyoto	7	11	8	5	2	2	3	1	1	1	1	5	2	1	1			1	1			53	Kyoto

Osaka	5	1	2	2	2	3	3	4	7	1	3	3	1	2	1	2	4	2	3			51	Osaka
Hyogo	5	13	5	1	2	4	2	6	1	1		3		4	2	6	1	1	2	1	1	61	Hyogo
Nara	1	4		3	1				3		1	1				1		1				16	Nara
Wakayama	1	1		2	1	3	1	2			1		2	2	1	2			1	14	1	35	Wakayama
Tottori			1					2			1				1	3	2	3	1			14	Tottori
Shimane	1	1	4		2	1	2		3	5	1	1			1		1		1			24	Shimane
Okayama		4	2	1	1	1	1	2	3		2	6	2					1				26	Okayama
Hiroshima	1	6	3	2	3	2	3	2	1	2	2		2	1			2		1		2	35	Hiroshima
Yamaguchi	1	3	2		1	1		1	3							1	1					14	Yamaguchi
Tokushima	3	1	1		1	2	1		1	1		1				2			3			17	Tokushima
Kagawa									2						1		1			2		6	Kagawa
Ehime			3	3	4	4	2		1					1			3	2		1	4	28	Ehime
Kochi	4	4	3	1		1	3		3			1				2	1		1	1	4	29	Kochi
Fukuoka	2	8	4		6	2	4	2	1	2				1	2	1		1		2	1	39	Fukuoka
Saga		1				1			1				1	1	2	1	2	1				11	Saga
Nagasaki	5	1	2	2	1		1	1							3	3	5	5	2		5	36	Nagasaki
Kumamoto	2	4	7	4		5		1			1		1		1		1	1	2	2		32	Kumamoto
Oita	4	4	3	1		1	2	1	2		1	2	4		1	2	2	1	2	3		36	Oita
Miyazaki	2	6	3	6	1	2	3	4	1	2	2	2	3		1			1	1	3	1	44	Miyazaki
Kagoshima	7	5	4	1	4		3			4	2	4		1	3	1	1		1			41	Kagoshima
Okinawa	1		1		3	1	1		2						1	1			2	1	1	15	Okinawa
total	141	151	149	109	114	118	87	95	79	64	61	72	59	48	68	74	79	68	79	86	86	1,887	total

Fatal and non-fatal accidents mean fatal and non-fatal injuries and occupational diseases with work absence of 4 days and more. Data of 2011 year include fatal and non-fatal accidents caused by Great East Japan Earthquake in 2011.

Data sources: <a href="https://anzeninfo.mhlw.go.jp/user/anzen/tok/anst00.htm">https://anzeninfo.mhlw.go.jp/user/anzen/tok/anst00.htm</a> (MHLW, Japan)

Return to <a href="https://www.jisha.or.jp/english/statistics/2021e\_industry.html">https://www.jisha.or.jp/english/statistics/2021e\_industry.html</a>

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Fatal accidents in tunnel construction work in Japan in 1999-2021

tunnel construction work industry Code No.030102

Type of fatal accidents in tunnel construction work in 1999-2021

Type of accidents	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	total	Type of accidents
fall from height	2	1		1	3			3	3				1	1	1	1			3					20	fall from height
falling to same level			1			1																		2	falling to same level
crash						1						1												2	crash
struck by flying or falling object		2	2	2	1		1									1		1				1		11	struck by flying or falling object
collapse	4	3	2	4	1				1	1	2	1		6	2	1	1	3	1	1	1	1	1	37	collapse
crashed by	3	3	3			1		1	1	1			1	1		1								16	crashed by
caught in/between	2	4	1	1	5		1	2	2	3	3	1	1		1		3	2	3	5		5		45	caught in/between
cut																									cut

			i	i			i	i	i											i	i		i	i	i i
injury to the sole of																									injury to the sole
the foot																									of the foot
drown														2							1		1	4	drown
contact to high/low-																									contact to
temperature																									high/low-
temperature																									temperature
contact to harmful																									contact to
																									harmful
substance																									substance
electric shock																									electric shock
explosion										2				2										4	explosion
burst																									burst
fire			1																					1	fire
traffic accident (public																									traffic accident
road)																							1	1	(public road)
																									traffic accident
traffic accident (others)																									(others)
reaction to																									reaction to
motion/improper																									motion/improper
motion																									motion
others								9																9	others
unclassifiable																									unclassifiable
total	11	13	10	8	10	3	2	15	7	7	5	3	3	12	4	4	4	6	7	6	2	7	3	152	total

Causal (L) agents	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	3 2014	2015	2016	2017	7 2018	2019	2020	2021	total	Causal (L)
machine	3	4	3	3	4			3	2	3	2		2	2		1	2	3	3	2		2		44	machine
crane, conveying machine	3	2	2		2	3	1	1		1	1	2		1			1			3		3	1	27	crane, conveying machine
other equipment								1		1				1					1					4	other equipment
temporary buildings, establishments	2	2	3	1	2			1	3				1	6	2	1			2			1		27	temporary buildings, establishments
substance, material					1				1	2				2		1								7	substance, material
load		1																1						2	load
environment	3	4	2	4	1		1	9	1		2	1			2	1	1	2	1	1	2	1	2	41	environment
others																									others
total	11	13	10	8	10	3	2	15	7	7	5	3	3	12	4	4	4	6	7	6	2	7	3	152	total

Causal agents (middle) of fatal accidents in tunnel construction work in 1999-2021

Causal (M) agents	1000	2000	2001	2002	2003	2004	2005	2006	2007	2008	2000	2010	2011	2012	2013	2014	2015	2016	2017	2018	2010	2020	2021	total	Causal (M)
ausai (M) ageilts	1999	2000	2001	2002	2003	2004	2003	2000	2007	2008	2009	2010	2011	2012	2013	2014	2013	2010	2017	2010	2019	2020	2021	totai	agents

engine																							engine
power transmission mechanism																							power transmission mechanism
woodworking machine																							woodworking machine
construction machine	2	3	3	3	4			3	2	3	2		2	2	1	2	3	1	2	2		40	construction machine
metal manufacturing machine																							metal manufacturing machine
general machine	1	1																1				3	general machine
mobile silviculture machine																		1				1	mobile silviculture machine
crane			1		2			1														4	crane
conveying machine	3	2	1			3	1			1	1	2		1		1			3	3		22	conveying machine
vehicle																					1	1	vehicle
pressure vessel																							pressure vessel
chemical facilities																							chemical facilities
welding equipment																							welding equipment

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kiln, caldron																								kiln, caldron
electric equipment																								electric
7																								equipment
human power machine,													1					1					2	human power
tools																								machine, tools
tools									1														1	tools
other equipments,																								other
facilities							1																1	equipments,
																								facilities
temporary buildings,																								temporary
establishments	2	2	3	1	2		1	3				1	6	2	1			2			1		27	buildings,
																								establishments
hazards, harmful																								hazards,
substances									2				2										4	harmful
Substances																								substances
materials					1			1							1								3	materials
load		1															1						2	load
										2														natural
natural environment	3	4	2	4		l	9	I			I			2	I	I	2		I	2		2	41	environment
other causal agent																								other causal
other causar agent																								agent
no causal agent																								no causal
no causai agent																								agent
unclassifiable																								unclassifiable
			===			 			===															-

total	11	13	10	8	10	3	2	15	7	7	5	3	3	12	4	4	4	6	7	6	2	7	3	152	total	
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Causal agents (small) of fatal accidents in tunnel construction work in 1999-2021

Causal (S) agents	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	total	Causal (S) agents
engine																									engine
power transmission																									power transmission
mechanism																									mechanism
circular sawing																									circular sawing
machine																									machine
band sawing																									band sawing
machine																									machine
wood planer																									wood planer
machine																									machine
hollow chisel																									hollow chisel
mortiser, wood																									mortiser, wood
borer																									borer
chamfering																									chamfering
machine, router,																									machine, router,
woodworking																									woodworking
milling machine																									milling machine
chain saw																									chain saw
other woodworking																									other woodworking
machines																									machines

leveling,																				leveling,
transporting or				1											1		1		3	transporting or
loading machine																				loading machine
excavating machine		2	3	2	1		2		1	1	1		1	2			1		17	excavating machine
foundation work																				foundation work
machine																				machine
hardening machine																				hardening machine
demolition machine	1				1			1	1										4	demolition machine
vehicle for high lift							1	1		1						1		2	6	vehicle for high lift
work							I	1								1			0	work
other construction	1	1			2				1		1	2			2				10	other construction
machines									ľ											machines
lathe																				lathe
drill press, milling																				drill press, milling
machine																				machine
grinding machine,																				grinding machine,
buffing machine																				buffing machine
power press																				power press
forging pressure																				forging pressure
hammer																				hammer
shearing machine																				shearing machine
other metal																				other metal
manufacturing																				manufacturing
machines																				machines

centrifugal machine															centrifugal machine
mixer, grinder	1										1			2	mixer, grinder
roll machine (except															roll machine (except
printingroll															printingroll
machine)															machine)
injection molding															injection molding
machine															machine
food manufacturing															food manufacturing
machine															machine
printing machine															printing machine
industrial robot															industrial robot
other general															other general
power machines														I	power machines
felling machine											1			1	felling machine
mobile logging															mobile logging
machine															machine
skyline yarding															skyline yarding
machine															machine
other mobile															other mobile
silviculture machine															silviculture machine
crane			1											1	crane
mobile crane		1	1		1									3	mobile crane
derrick crane															derrick crane
elevator, lift															elevator, lift

cargo lifting																			cargo lifting
appliance																			appliance
gondola																			gondola
lumberyard																			lumberyard
equipment, logging																			equipment, logging
cableway																			cableway
simple skyline																			simple skyline
yarding equipment																			yarding equipment
other powered																			other powered
crane																			crane
truck	1	2	1						1	2			1		3	2		13	truck
forklift																			forklift
railway equipment	2				3	1		1			1					1		9	railway equipment
conveyor																			conveyor
loader																			loader
straddle carrier																			straddle carrier
rough terrain hauler																			rough terrain hauler
other powered																			other powered
conveying machines																			conveying machines
cars, bus,																	1	1	cars, bus,
motorcycle																	<b>I</b>		motorcycle
railway vehicle																			railway vehicle
other vehicles																			other vehicles
boiler																			boiler

	 	 ==	 	 	=	=	 	=		 	=	=		=	 	_	-	
pressure vessel																		pressure vessel
other pressure																		other pressure
vessels																		vessels
chemical facilities																		chemical facilities
gas welding																		gas welding
equipment																		equipment
arc welding																		arc welding
equipment																		equipment
other welding																		other welding
equipment																		equipment
kiln, caldron																		kiln, caldron
industrial dryer																		industrial dryer
other kiln, caldron																		other kiln, caldron
transmission																		transmission
electric power																		electric power
facilities																		facilities
other electrical																		other electrical
equipment																		equipment
human power									1				1				2	human power
cranes									•				'					cranes
human power																		human power
hauling equipment																		hauling equipment
human power																		human power
machine																		machine

hand tool																				hand tool
ladder																				ladder
slinging tool																				slinging tool
other tools									1										1	other tools
other equipment,							1												1	other equipment,
scaffolding	1				1			1				1							4	scaffolding
timbering			2									5	1						8	timbering
stairs, landing stage	1	1											1						3	stairs, landing stage
opening								1								1			2	opening
roof, beam, haze, crossbeam, principal rafter																				roof, beam, haze, crossbeam, principal rafter
working platform,																				working platform, boot board
passage																				passage
building, establishment		1	1	1	1		1	1						1		1		1	9	building, establishment
other temporary buildings, establishments											1									other temporary buildings, establishments
explosive substance																				explosive substance
inflammable substance																				inflammable substance

						 						 											4
inflammable gas									2			2										4	inflammable gas
harmful substance																							harmful substance
radiation																							radiation
other hazards,																							other hazards,
harmful substances																							harmful substances
metal material					1			1						1								3	metal material
lumber, bamboo																							lumber, bamboo
stone, sand,																							stone, sand,
substance																							substance
other materials																							other materials
load		1														1						2	load
machine/equipment																							machine/equipment
as load																							as load
natural ground,	3	4	2	4	1	1		1		2	1		2		1	2	1		1	1	1	28	natural ground,
rock	,					'		'							ļ ·		ľ		'	ľ	<u> </u>	20	rock
standing tree														1								1	standing tree
water																			1		1	2	water
abnormal																							abnormal
environment																							environment
high/cold																							high/cold
temperature																							temperature
environment																							environment
other environments							9											1				10	other environments
other causal agent																							other causal agent

no causal agent																									no causal agent
unclassifiable																									unclassifiable
total	11	13	10	8	10	3	2	15	7	7	5	3	3	12	4	4	4	6	7	6	2	7	3	152	total

Workers age of fatal accidents in tunnel construction work in 1999-2021

Age	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	total	Age
19 years old or less																									19 years old or less
20-29	1	2	3	1	2			1				1					1	1			1	1		15	20-29
30-39		1	1		1			6	1	1	3		3	2		2		2	1	3			1	28	30-39
40-49	4	4	3	1	2	1	2	2		2		1		3	2	1		1	4			1	1	35	40-49
50-59	4	6	3	6	4	2		4	6	3	2	1		4	1	1	1	1	1	3				53	50-59
60 years old or	2				1			2		1				3	1		2	1	1		1	5	1	21	60 years old or
total	11	13	10	8	10	3	2	15	7	7	5	3	3	12	4	4	4	6	7	6	2	7	3	152	total

Workers' number of workplace of fatal accidents in tunnel construction work in 1999-2021

Workers scale	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	total	Workers scale
9 workers or less	1	2	1	3				6	3				1	4	2			2	3			3		31	9 workers or less
10-29	6	3	4	2	7			6	3	4	1	1	1		1		2	2	2	3	1	2		51	10-29
30-49	1	6	3	1	2	3	1	1		1	4	1	1	4	1	3		1	1	1	1		1	38	30-49
50-99	3	1	1	1				2	1	1							1	1	1	1		1	2	17	50-99

100-299		1	1	1	1		1			1		1		4		1	1			1		1		15	100-299
300 workers or																									300 workers or
more																									more
total	11	13	10	8	10	3	2	15	7	7	5	3	3	12	4	4	4	6	7	6	2	7	3	152	total

## Month of fatal accidents in tunnel construction work in 1999-2021

Month	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	total	Month
January	1	1				1		1	1	1	1					1		1	1	1		1		12	January
February		1		1	3				1		1			5	1			1		1		1		16	February
March	1		2	2	2		2	1								1			1	1	1	2	1	17	March
April			2	2					1	1				1	1		1		1					10	April
May		2			1					2		1		2	1	1		1	1			1		13	May
June	1		1		1			3	1			1		1		1			1					11	June
July		2			2					3			1				1			1				10	July
August	1	1	2	1		1		1			1												1	9	August
September	2		2			1			1		1		2							1				10	September
October	2	2		1							1			2				1			1	1	1	12	October
November	1	1	1	1	1			9				1			1		1		1	1		1		20	November
December	2	3							2					1			1	2	1					12	December
total	11	13	10	8	10	3	2	15	7	7	5	3	3	12	4	4	4	6	7	6	2	7	3	152	total

Prefecture	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	total	Prefecture
Hokkaido		2			1		1	9			1				1		1		1	1		3		21	Hokkaido
Aomori		1							1															2	Aomori
lwate	2															1	1	2			1		1	8	lwate
Miyagi																									Miyagi
Akita																									Akita
Yamagata	1	1	1								1													4	Yamagata
Fukushima	1																				1			2	Fukushima
Ibaraki																									Ibaraki
Tochigi		1																						1	Tochigi
Gunma			1						1															2	Gunma
Saitama																									Saitama
Chiba				2		1													1					4	Chiba
Tokyo						1	1	2	1		1		1	1		2			1					11	Tokyo
Kanagawa	1	4						1											1					7	Kanagawa
Niigata					2					2				2								1		7	Niigata
Toyama	1		1																					2	Toyama
Ishikawa																			1					1	Ishikawa
Fukui			1							1	1									1		1		5	Fukui
Yamanashi												1				1		1				2		5	Yamanash
Nagano	1	1	1																1	1				5	Nagano
Gifu		1		1								1					1	1					1	6	Gifu

Shizuoka		1	2	2									1					1			7	Shizuoka
Aichi														1			1				2	Aichi
Mie					1				2											1	4	Mie
Shiga			1	1	1																3	Shiga
Kyoto														1							1	Kyoto
Osaka	1				1					1		1									4	Osaka
Hyogo	1		1															1			3	Hyogo
Nara					1																1	Nara
Wakayama								1								1					2	Wakayama
Tottori																						Tottori
Shimane				1								1									2	Shimane
Okayama											1		6								7	Okayama
Hiroshima																						Hiroshima
Yamaguchi							1														1	Yamaguchi
Tokushima																						Tokushima
Kagawa																						Kagawa
Ehime							1														1	Ehime
Kochi		1											2								3	Kochi
Fukuoka	1							2	1												4	Fukuoka
Saga																						Saga
Nagasaki					1				1							1		1			4	Nagasaki
Kumamoto			1				1														2	Kumamoto
Oita																						Oita

Miyazaki					2	1									1		1							5	Miyazaki
Kagoshima	1								1															2	Kagoshima
Okinawa				1																				1	Okinawa
total	11	13	10	8	10	3	2	15	7	7	5	3	3	12	4	4	4	6	7	6	2	7	3	152	total

Data sources: <a href="https://anzeninfo.mhlw.go.jp/user/anzen/tok/anst00.htm">https://anzeninfo.mhlw.go.jp/user/anzen/tok/anst00.htm</a> (MHLW, Japan)

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