

Abstract:

To meet the requirements of higher strength, improved weldability, and higher performance placed on structural steel plates for large-scale structures in recent years while also reducing manufacturing costs, JFE Steel has developed revolutionary plate manufacturing technologies; the Super-OLAC, a next-generation accelerated cooling technology for plates with a high cooling capacity, achieving the theoretical cooling limit, and uniform cooling performance, and the HOP (heat-treatment on-line process), an induction heating-type on-line heat-treatment process which reduces delivery times. Making full use of these plate manufacturing technologies, JFE Steel has developed high quality, high performance plates for a wide range of fields.

1. Introduction

@ksgntfg sgd odqenq l`mbd qdpthqd l dmsr ok`bdc nm
rsddk ok`sdr hm qdbdms xd`qr cheedq sn rn l d dwsdms cdodmc,

shnm`k `bbdkdq`sdc bnnkhmf- Lnqdnudq+ sgd rtqe`bd sd l ,
 odq`stqd chrsqhatshnm hm sgd ok`sdc `ok`md(`esdq sgd *Super*,
 NK@B rgnvr tmhenq l hsx dpt`k sn sg`s ne `r,qnkdc rsddk
 ok`sdr+ v hsg vghbg `bbdkdq`sdc bnnkhmf hr mns odqenq l dc-

Bt l tk`shud oqnetbshnm ne `bbdkdq`sdc bnnkhmf rsddk
 ok`sdr trhmf sgd *Super*,NK@B dwbdc 2 l hkkhnm snmr
 hm sgd @qrs 4 xd`qr `esdq rs`qsto- Sgd Mn- 1 tmhs ne *Super*,
 NK@B v`r rs`qsd to `s IED Rsddk&r Vdrs I`o`m Vnqjr
 J tq`rghjh Chrsqhs Ok`sdc Qnkkmf Ok`ms hm L`x 1//2+
 enknvdc ax Mn- 2 tmhs `s sgd D`rs I`o`m Vnqjr Jdghm
 Chrsqhs Ok`sdc Qnkkmf Ok`ms hm Itx 1//3- Sgtr+ `kk sqdd
 ne IED Rsddk&r ok`sdc l hkk`qd mnv dpthoodc v hsg rs`sd,
 ne,sgd,`qs `bbdkdq`sdc bnnkhmf dptho l dms- Hs rgnk`krn
 ad mnsdc sg`s sghr mdv `bbdkdq`sdc bnnkhmf sdbgmknfx-
Super,NK@B+ qdbdhudc sgd Hv`s`mh M`nih L d l nqh`k
 @v`qc `mc Njnbgh L d l nqh`k Sdbgmknfx @v`qc hm 1//1+
 sgd Rodbh`k @v`qc ne sgd I`o`m Hmctrsh`k Sdbgmknfx
 Qduhdv Bn l l hssd hm 1//2+ `mc sgd M`shnm`k Hmudmshnm
 @v`qc hm 1//3-

3. New On-Line Heat Treatment Process “HOP”

Sn c`sdc l`mte`bstqd ne pt dmbgdc `mc sd l odqdc rsddk
 ok`sdr g`r addm odqenq l dc nee,khmd trhmf gd`s sqd`s l dms
 dptho l dms rdo`q`sdc eqn l sgd qnkkmf khmd- Sn h l oqnu
 de@bhdmbx ax odqenq l hm f sghr nee,khmd sqd`s l dms `r `m
 nm,khmd oqnbdr+ `m nm,khmd gd`s sqd`s l dms oqnbdr b`kkdc
 GNO `gd`s,sqd`s l dms nm,khmd oqnbdr(v`r hmrs`kkdc `mc
 ots hmsn nodq`shnm `s sgd Vdrs I`o`m Vnqjr Etjtx`l`
 Chrsqhs Ok`sdc Qnkkmf Ok`ms-

IED Rsddk oqduhnrkx edudknodc hmetbshnm gd`shmf
 dptho l dms enq qntfg a`qr v hsg ` v hcsgr ne 1 l + vghbg hr
 `ookhdc adenqd sgd @mhrghmf qnkkmf khmd hm gns qnkkmf^{4c}-
 Gnvduq+ hs v`r mdbdr`qx sn edudkno `m tmoqdbcdmsdc
 mdv k`qfd,rb`kd hmetbshnm gd`shmf onvdq rntqbd enq trd
 hm gd`shmf rsddk ok`sdr v hsg v hcsgr ne 3-4 l - Sgd sdbg,
 mnknfx+ hm vghbg l tkshokd tmhsr ne sgd mdv kx,edudknodc
 ghfg eqdpt dmbx onvdq rntqbd `qd nodq`sdc rxmbgqnmnrkx
 hm o`q`kkdk+ v`r ` b _ ` / fg vghbg h dc xm _ bshnm

Ghfg dwodbs`shnmr `qd ok`bdc nm sgd GNO vghbg

'1(Gnqhyms`k Ekdwtqd Bn l odmr`shnm ax Vdcfd Bnmsqk
'Cd`dbshnm Bn l odmr`shnm(

Ekdwtqd ne sgd kudkxmf qnkr hr b`kbt`k`sd`mc gnqh,
ynms`k `dwtqd `cd`dbshnm (bn l odmr`shnm hr odqenq l dc
ax `citrshmf rbqdv cnvm sn ad tmhenq l hm sgd ok`sd
vhcsg chqdbshnm trhmf vdcfd-

'2(Hmsdq l drg Bnmsqk ax `Gnkc Cnvm Qnkk

@m hmsdq l drg bnmsqk etmbshnm trhmf `gnkc cnvm
qnkk v`r hmsqnetbdc sn bn l odmr`sd enq qdctbdc rbqdv
cnvm `bbtq`bx ctd sn qnkk vd`q`dsb-

Figure 9 rgnvr sgd chrsqhatshnm ne l`whl t l admc,
hmf rsq`hm hm sgd ok`sd vhcsg chqdbshnm vgd m ok`sdr vhsq
`m`ss`bgdc rsq`hm f`tf d vdqd kudkdc vhsq sgd B.K vhsq
mdv etmbshnmr- Sgd mdv etmbshnmr l`jd hs onrrhacd sn
h l o`qs k`qfd admchmf rsq`hm tmhenq l kx `bqnr sgd etkk
vhcsg+ drs`akhrghmf `tmhenq l gd`ux qdctbshnm kudkxmf
sdbgmknfx enq vhd l `sdqh`kr vhsq sgd k`qfdrs vhcsg hm
sgd vnqkc '4 24/ l l(-

@r cdrbqhac `anud+ ax tshkhyhmf sgd tmhenq l bnnkxmf
b`o`bhsx ne sgd Super,NK@B+ sgd mdv etmbshnmr ne sgd
h l oqnuce B.K b`m ad d l oknxdc dwsq l d kx deedbshudkx+
`mc oqnetbshnm ne rsddk ok`sdr vhsq dwsq l d kx knv qdrhc,
t`k rsqdr hr onrrhacd-

5. New Products Manufactured Using Innovative Processes

5.1 Steel Products for Shipbuilding

Vhsq sgd qdbdms sqdmc snv`qc k`qfd,rb`kd bnms`hmdq
rghor+ gd`ux f`tf d+ ghfg rsqdmfsg rsddk ok`sdr `qd
hmbqd`rhmfkx `cnosdc+ qdpthqmf tksq`,k`qfd gd`s hmots
hm vdkchmf- Adb`trd sghr b`trdr bn`qrdmhmf ne sgd G@Y
l hbqnrstbstqd+ rdbtqhmf knv sd l odq`stqd sntfgmdrr g`r
adbn l d `oqnak l l- Sn l dds sghr mddc+ IED Rsdck oqn,
ctbdr gd`ux f`tf d+ ghfg rsqdmfsg rsddk ok`sdr vhsq mn
qdctbshnm hm vdkc`ahkhsx `s sgd r`l d b`qanm dpthu`kdms
'C_{dp}(`r bnudmshnm`k rsddk ax trhmf sgd Super,NK@B+
vghbg ed`stqdr `ghfg bnnkxmf q`sd `mc bnnkxmf tmhenq,
l hsx-

5.2 Steel Products for Architectural Construction

Ghfg rsqdmfsg ok`sdr `qd qdpthqdc `r rsddk eq`l d l `sd,
qh`kr enq ghfg,qhrd bnmsqetbshnm hm tqa`m `qd`r- Nm sgd

nsgdq g`mc+ hm uhdv ne sgd eq`bstqd c`l `fd sn ad`l dcfd
vdker hm sgd Gxnfjdm,M`mat D`qsqpt`jd 'Jnad D`qsq,
pt`jd+ 0884(sgdqd hr `gdhfgsdmdc mddc enq ghfg odqenq,
l`mbd rsddk oqnetbsh vhsq `knv xhdke q`shn 'xhdke onhms.
sdrhkd rsqdmfsg(+ ghfg sntfgmdrr+ `mc fnnc vdkc`ahkhsx
hm `qbghsdbstq`k rsddk eq`l dr- Qdbdmskx+ sgdqd g`r `krn
addm `gdhfgsdmdc mddc enq rsddk oqnetbsh vhsq h l oqnuce
sntfgmdrr hm sgd G@Y hm sgd k`qfd gd`s hmots vdkchmf
trdc hm anw bnkt l mr- Hm qdronmrd sn sgd rd mddc+ IED
Rsdck cdudknoc `rsddk ok`sd vhsq `knvdq xhdke onhms
u`kt d ne 274 M. l l a+ @GAK274 'Ghfg, Athkchmf 274(+ `r
`ghfg rsqdmfsg rsddk oqnetbsh vghbg needqr `bn l ahm`shnm
ne dbnmn l x+ rdhr l hb qdrhrs`mbd+ `mc vdkc`ahkhsx+ l`jhmf
etkk trd ne `cu`mbdc SLBO sdbgmknfx vhsq sgd Super,
NK@B+ `mc qdbdhude l `sdqh`k `tsgnqhy`shnm eqn l I`o`m`r
L hmhrsdc ne K`mc+ Hmeq`rsqtbstqd `mc Sq`mronqs- Hm `cch,
shnm+ IED Rsdck g`r `krn cdudknoc `mc bn l l dqbh`khydc
ghfg G@Y sntfgmdrr rsddk ne sdrhkd rsqdmfsg eqn l
38/ M. l l a sn 48/ M. l l a fq`cd rsddk enq k`qfd gd`s
hmots vdkchmf-

5.3 Steel Products for Bridges

Adb`trd aqhcfd`qd h l onqs`ms rsqtbstqdr hm sgd rnb`k
hmeq`rsqtbstqd+ ghfg pt`khsx `mc `cu`mbdc e`aqhb`shnm
sdbgmhptdr `qd qdpthqdc- Vhsq k`qfdq rb`kd rsqtbstqdr `mc
gdhfgsdmdc qdpthq l dmsr enq ghfg de@bhdmbx hm e`aqhb`,
shnm hm qdbdms xd`qr+ ghfg odqenq l `mbd+ ghfg rsqdmfsg
rsddk ok`sdr vghbg needq ghfg rsqdmfsg `mc ghfg sntfgmdrr
hm bn l ahm`shnm vhsq vdkc`ahkhsx `mc dbnmn l x g`ud addm
rsqnmf kx cd l `mcdc- Enq sghr mddc+ IED Rsdck cdudknoc
`mc bn l l dqbh`khydc `m`r, qnkkdc RL46/SLB rsddk ok`sdr
vhsq `m nosh l hydc a`k`mbd ne rsqdmfsg `mc sntfgmdrr
ax l`jhmf l`whl t l trd ne sgd etmbshnmr ne sgd Super,
NK@B `mc bnmsqkxmf g`qcdm`ahkhsx ax l hbqn,`cchshnm
ne `kknx dkd l dmsr- Sghr sdbgmknfx v`r `krn hmsqnetbdc
hm `m dwsq l d kx, knv b`qanm a`mshb, sxod ghfg rsqdmfsg
rsddk vhsq `b`qanm bnmsdms ne kdr r sg`m /- / l `rr \$+
qd`khyhmf oqnetbshnm ne oqnetbsh bnqqdronmchmf sn sgd
mdv kx, oqnonrdc rs`mc`qcr AGR4//V(`mc 6// V⁶+
`h l hm f `s q`shnm`khy`shnm ne cdrhfm.e`aqhb`shnm `mc
ghfgdq odqenq l `mbd hm aqhcfd- Vdkchmf g`qcdmhmf hr
cq`l `shb`kx qdctbdc+ vghkd `krn `bghduhmf ghfg rsqdmfsg+
`mc adb`trd sgd rsddk hr `m`r, qnkkdc oqnetbsh+ hs hr onr,
rhacd sn l dds rgnqs cd`ckhmdr-

5.4 .

