

Title (en)
A METHOD FOR PRODUCING HIGH-CARBON STEEL RAILS EXCELLENT IN WEAR RESISTANCE AND DUCTILITY

Title (de)
VERFAHREN ZUR HERSTELLUNG VON SCHIENEN AUS KOHLENSTOFFFREICHEM STAHL MIT HERVORRAGENDER VERSCHLEISSFESTIGKEIT UND DUKTILITÄT

Title (fr)
PROCEDE DE PRODUCTION DE RAILS D'ACIER A HAUTE TENEUR EN CARBONE TRES RESISTANT A L'USURE ET TRES DUCTILE

Publication
EP 1730317 A1 20061213 (EN)

Application
EP 05726643 A 20050309

Priority

- JP 2005004582 W 20050309
- JP 2004065676 A 20040309
- JP 2004285934 A 20040930

Abstract (en)
[origin: EP2071044A1] Disclosed are methods of producing steel rails having a high carbon content and being excellent in wear resistance and ductility from the slabs for rails. One method involves producing a steel rail having a high content of carbon, comprising finish rolling the rail in two consecutive passes, with a reduction rate per pass of a cross-section of the rail of 2-30%, wherein the conditions of the finish rolling satisfy the following relationship: $S \leq 800 / (C \times T)$, wherein S is the maximum rolling interval time (seconds), C is the carbon content of the steel, wherein the carbon content is 0.85-1.40 mass%, and T is the maximum surface temperature (°C) of the rail head. Another method involves producing a steel rail with a high content of carbon, comprising: finish rolling the rail in three or more passes, with a reduction rate per pass of a cross-section of the rail of 2-30%, wherein the conditions of the finish rolling satisfy the following relationship: $S \leq 2400 / (C \times T \times P)$, wherein S is the maximum rolling interval time (seconds), C is the carbon content of the steel rail, wherein the carbon content is 0.85-1.40 mass%, T is the maximum surface temperature (°C) of a rail head, and P is the number of passes, which is 3 or more. In addition to above, controlled additional amounts of V, Nb, N may be added to the steel rail and/or controlled rapid cooling of the rail after rolling may be accomplished to provide further improvements.

IPC 8 full level
C21D 8/00 (2006.01); **B21B 1/08** (2006.01); **C22C 38/00** (2006.01); **C22C 38/58** (2006.01); **B21B 1/085** (2006.01)

CPC (source: EP US)
C21D 9/04 (2013.01 - EP US); **C22C 38/02** (2013.01 - EP US); **C22C 38/04** (2013.01 - EP US); **C22C 38/18** (2013.01 - EP US); **C22C 38/24** (2013.01 - EP US); **B21B 1/085** (2013.01 - EP US); **C21D 2211/009** (2013.01 - EP US)

Cited by
DE102012020844A1; WO2014063671A1

Designated contracting state (EPC)
AT DE FR GB LU

DOCDB simple family (publication)
WO 2005085481 A1 20050915; AT E435308 T1 20090715; BR PI0508533 A 20070814; BR PI0508533 B1 20131008; CA 2558850 A1 20050915; CA 2558850 C 20140218; DE 602005015199 D1 20090813; EP 1730317 A1 20061213; EP 1730317 B1 20090701; EP 2071044 A1 20090617; JP 2005290544 A 20051020; JP 4469248 B2 20100526; US 2007181231 A1 20070809

DOCDB simple family (application)
JP 2005004582 W 20050309; AT 05726643 T 20050309; BR PI0508533 A 20050309; CA 2558850 A 20050309; DE 602005015199 T 20050309; EP 05726643 A 20050309; EP 09004035 A 20050309; JP 2004285934 A 20040930; US 59084605 A 20050309