The invention deals with a press hardened steel part having a composition comprising, by weight percent: C 0.2-0.34 %, Mn 0.50–1.24 %, Si 0.5–2 %, P≤0.020 %, S≤0.010 %, N≤0.010 %, and comprising optionally one or more of the following elements: Al:≤0.2 %, Cr≤0.8 %, Nb≤0.06 %, Ti≤0.06 %, B≤0.005 % Mo≤0.35 % the remainder of the composition being iron and unavoidable impurities resulting from the smelting. The press hardened steel part has a microstructure comprising, in surface fraction, 95 % or more of tempered martensite and 5 % or less of bainite, austenite or ferrite.