

### ***Abstract***

The potential root causes of the premature fracture of an in-service caterpillar-type chain component (shoe block and the respective clamp holder) were investigated. The clamp holder's fracture surface and a cross section of the microstructure were examined by means of stereo- and optical microscopy. Hardness measurements were also taken. The clamp holder microstructure consisted of lower bainite. Fractographic examination revealed that fatigue (reversed bending mode under low applied stress) was the dominant mechanism resulting in the failure of the clamp holder. Crack initiation occurred at the outer surface of the holder which possessed deep surface defects. The final holder fracture subsequently caused unbalanced stress conditions overloading the shoe block (which is a secondary fracture phenomenon).