ABSTRAK

INVESTIGASI MEDIA *QUENCHING* LUMPUR TERHADAP SIFAT MEKANIK BAJA PEGAS BEKAS

Muhammad Rifqi
(2026: xix + 24 Halaman, 8 Gambar, 5 Tabel, 4 Lampiran)

Baja pegas bekas kendaraan banyak dimanfaatkan sebagai bahan baku perkakas karena memiliki kekuatan dan ketangguhan yang baik. Penelitian ini bertujuan untuk menginvestigasi pengaruh media *quenching* lumpur sawah terhadap kekerasan, ketangguhan impak, dan struktur mikro baja pegas bekas dibandingkan dengan media air, oli bekas, pendinginan udara, serta material tanpa perlakuan panas. Spesimen diaustenitisasi pada suhu 850°C selama 40 menit, kemudian didinginkan menggunakan variasi media. Pengujian meliputi kekerasan Rockwell C, impak Charpy, dan pengamatan struktur mikro menggunakan etsa Nital 1%. Hasil menunjukkan bahwa *quenching* air menghasilkan kekerasan tertinggi sebesar 52,74 HRC, diikuti oli 47,62 HRC, lumpur 44,90 HRC, raw material 42,20 HRC, dan udara 23,92 HRC. Spesimen *quenching* lumpur memiliki harga impak sebesar 0,0029 J/cm², lebih tinggi dibandingkan spesimen *quenching* air dan oli. Struktur mikro pada spesimen *quenching* lumpur menunjukkan fasa ferit pada daerah terang serta bainit atau campuran bainit–martensit pada daerah gelap. Media lumpur menghasilkan kombinasi kekerasan dan ketangguhan impak yang lebih baik dibandingkan media air dan oli, sehingga berpotensi digunakan sebagai alternatif media *quenching* yang ekonomis dan mudah diperoleh.

Kata Kunci: Baja Pegas Bekas, *Quenching*, Lumpur Sawah, Kekerasan Rockwell C, Impak Charpy, Struktur Mikro.

ABSTRACT

INVESTIGATION OF MUD MEDIA QUENCHING ON THE MECHANICAL PROPERTIES OF USED SPRING STEEL

Muhammad Rifqi
(2026: xix+ 24 pp., 8 Figures, 5 Tables, 4 Attachments)

Used vehicle leaf spring steel is widely utilized as a raw material for tools because of its good strength and toughness. This study investigated the effect of rice-field mud as a quenching medium on the hardness, impact toughness, and microstructure of used leaf spring steel compared with water, used oil, air cooling, and untreated material. The specimens were austenitized at 850°C for 40 minutes and subsequently cooled using different media. The tests included Rockwell C hardness testing, Charpy impact testing, and microstructural observation using 1% Nital etching. The results showed that water quenching produced the highest hardness of 52.74 HRC, followed by used oil at 47.62 HRC, mud at 44.90 HRC, raw material at 42.20 HRC, and air cooling at 23.92 HRC. The mud-quenched specimen produced an impact value of 0.0029 J/cm², which was higher than those of the water- and oil-quenched specimens. The microstructure of the mud-quenched specimen consisted of ferrite in the bright regions and bainite or a bainite–martensite mixture in the dark regions. Rice-field mud produced a better balance between hardness and impact toughness than water and used oil, indicating its potential as an economical and easily available alternative quenching medium.

Keywords : *used leaf spring steel, quenching, rice-field mud, hardness, impact toughness, microstructure.*