

Fig. 6 — Typical microstructure of the base metal.



Fig. 7 — Typical microstructure of the continuous-current weld.

fective by establishing a comparatively faster solidification rate for the droplets. Whereas, the increase in pulse duration reduces the pulse off-time and decreases the interruption in solidification by allowing less time for the droplets to solidify before forming the next droplet.

Porosity Content of Weld Deposit

The weld deposits were found to contain porosity (Fig. 8), which varied depending on the pulse parameters. At a given pulse duration, the influence of

Table 2 — Welding Parameters

| Mean Welding Current (A) | Base Current (A) | Peak Current (A) | Pulse Frequency (Hz) | Pulse Duration (ms) | Arc Voltage (V) | Travel Speed cm/min (in./min) |
|--------------------------|------------------|------------------|----------------------|---------------------|-----------------|-------------------------------|
| 235 | — | — | 0 | — | 23 | 20 (8) |
| 235 | 205 | 463 | 25 | 4.5 | 23 | 20 (8) |
| 235 | 175 | 434 | 50 | 4.5 | 23 | 20 (8) |
| 235 | 110 | 388 | 100 | 4.5 | 23 | 20 (8) |
| 235 | 190 | 470 | 25 | 6.5 | 23 | 20 (8) |
| 235 | 150 | 415 | 50 | 6.5 | 23 | 20 (8) |
| 235 | 70 | 323 | 100 | 6.5 | 23 | 20 (8) |
| 235 | 170 | 466 | 25 | 8.5 | 23 | 20 (8) |
| 235 | 125 | 385 | 50 | 8.5 | 23 | 20 (8) |
| 235 | 50 | 267 | 100 | 8.5 | 23 | 20 (8) |

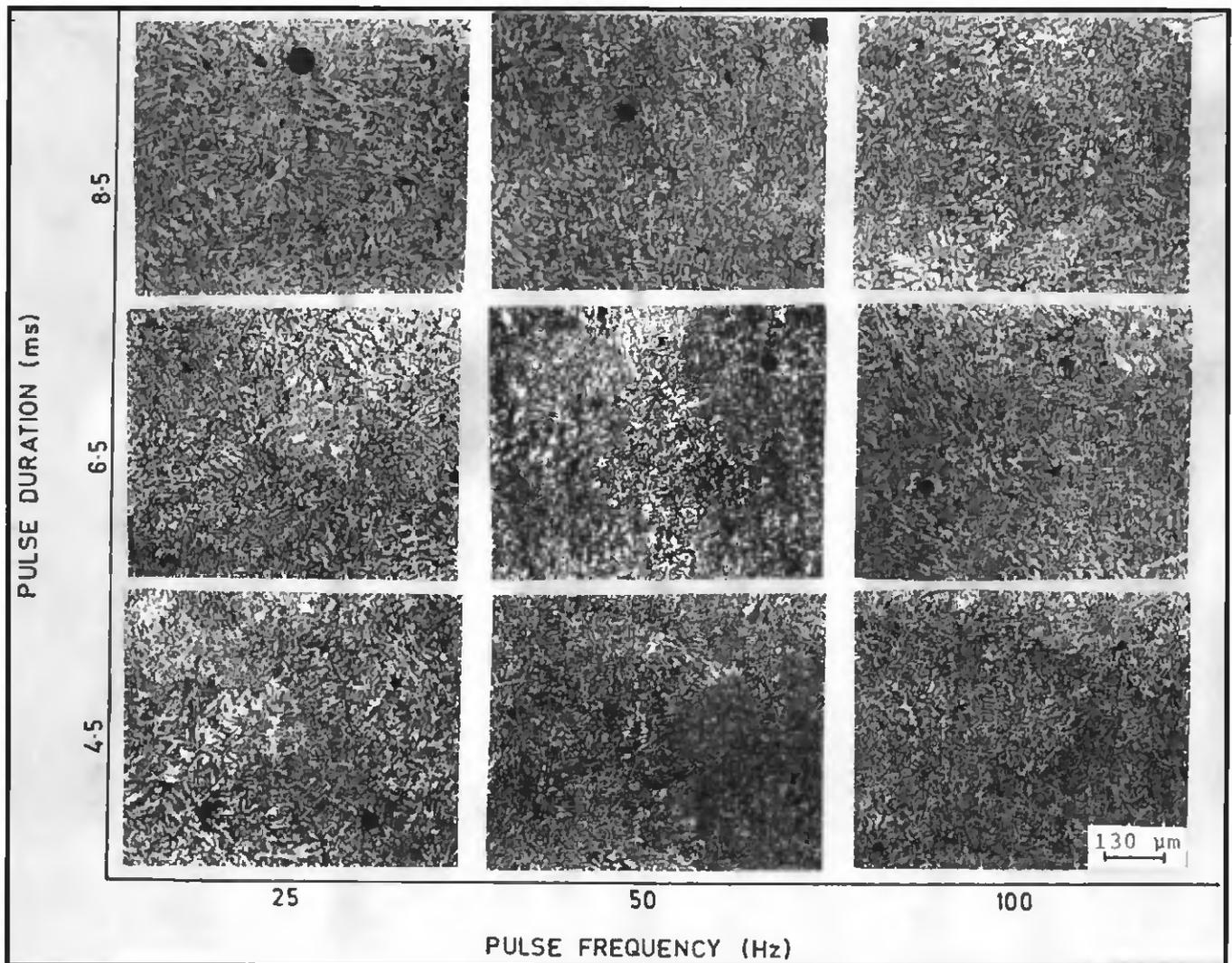


Fig. 8 — Influence of pulse frequency and duration on the microstructure of the weld deposit.

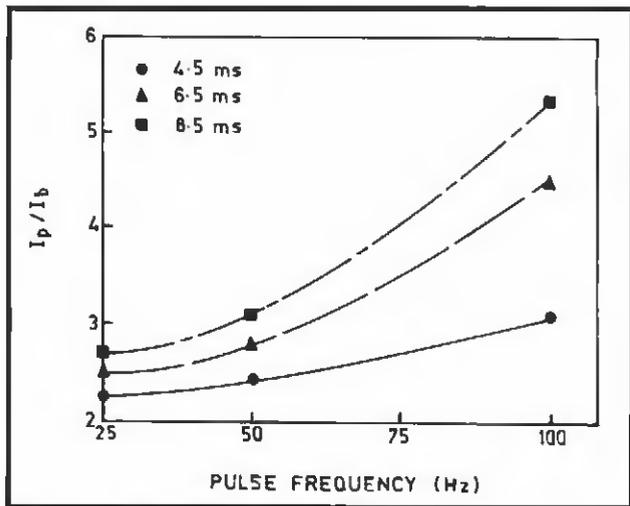


Fig. 11 — The influence of pulse frequency on I_p/I_b ratio.

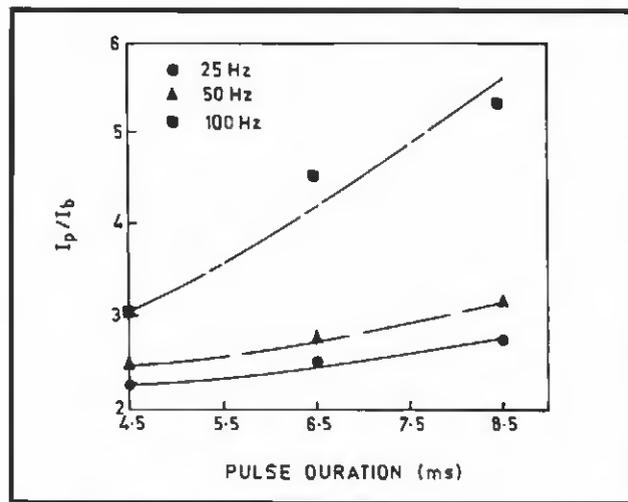


Fig. 12 — Influence of pulse duration on I_p/I_b ratio.

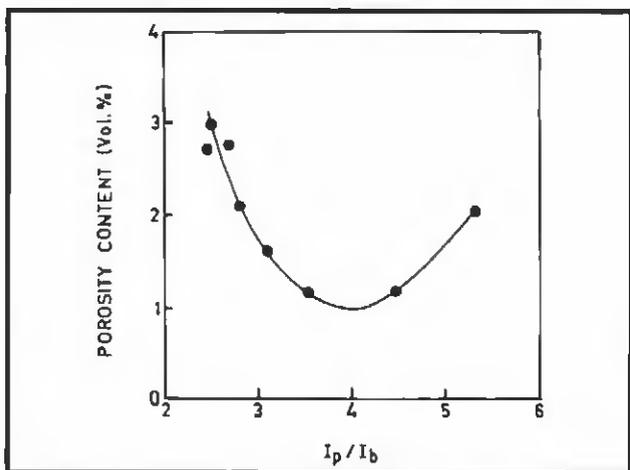


Fig. 13 — Influence of I_p/I_b ratio on porosity content in the weld deposit.

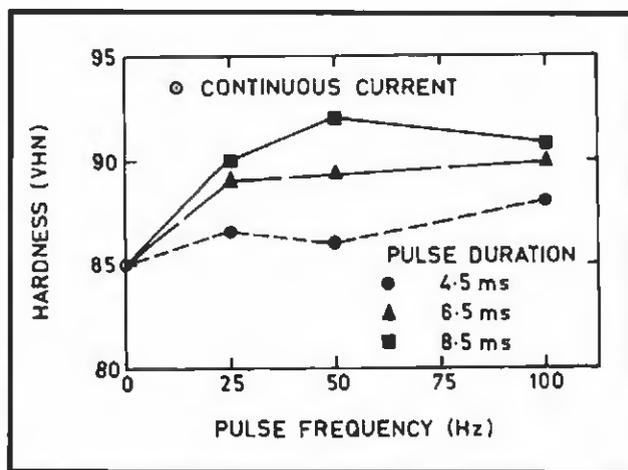


Fig. 14 — At a given pulse duration, the influence of pulse frequency on the hardness at the weld center.

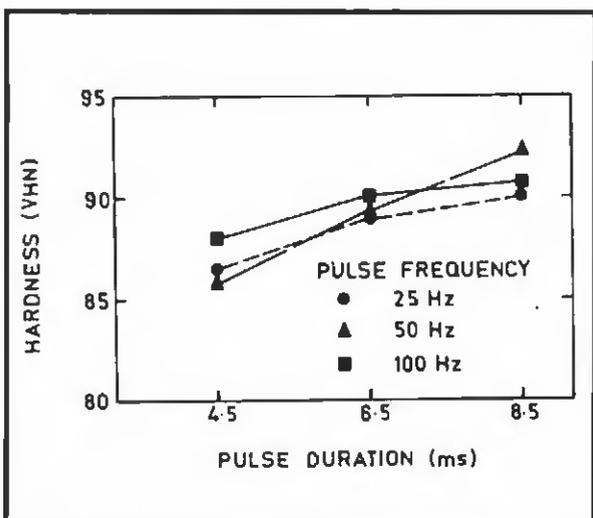


Fig. 15 — At a given pulse frequency, the influence of pulse duration on the hardness at the weld center.

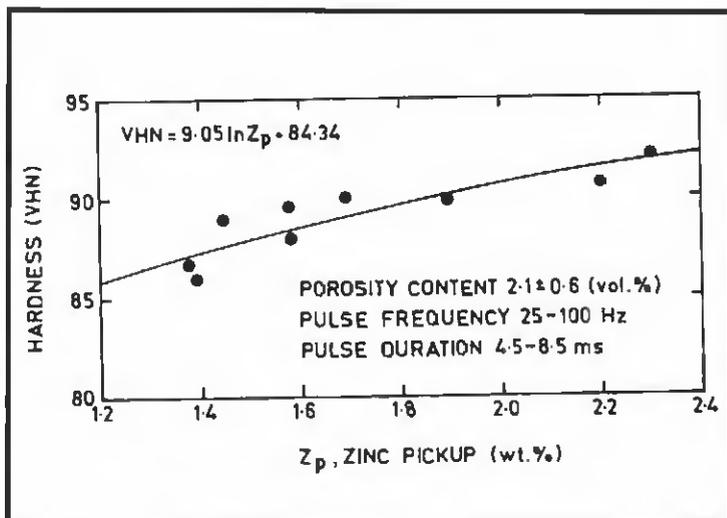


Fig. 16 — Correlation of the zinc pickup (Z_p) with the hardness of the weld deposit.

