

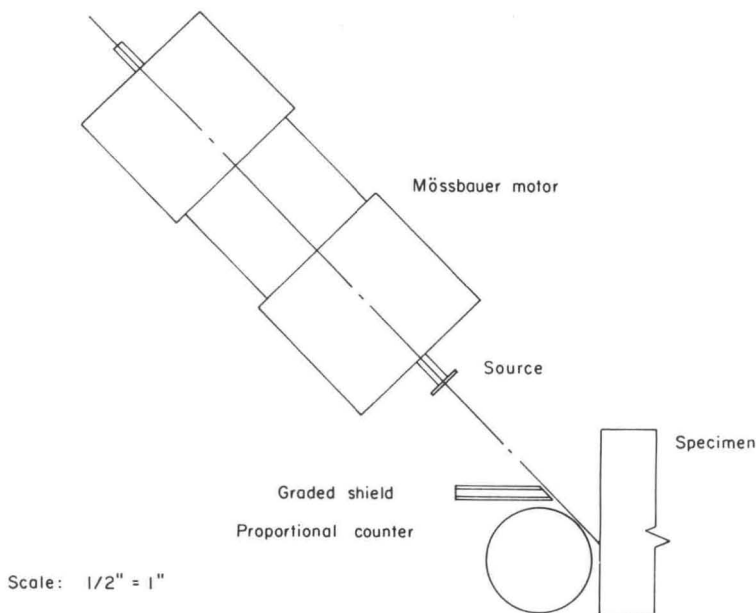


Figure 5. 45° geometry for front-surface Mössbauer spectroscopy.

5. Phases of Steels

Several spectra of steels are shown next, taken in back-scatter mode (Fig. 6-11). This results in spectra which point up, as in emission, rather than absorption. Note the effect of rust on the cast-iron sash weight. There are many different kinds of rust—this one is β -FeOOH.

6. Effect of Pressure

Pressure shifts the center of the Mössbauer spectrum to the left (lower energy). The amount of this shift is small for realizable stresses. At 100,000 psi, the shift is 2% of a line width. Such a small shift can be measured with scanning spectrometers, but with marginal accuracy. As we seek to determine stresses to 10,000 psi and less, a better experimental approach is required.

The count rate vs. stress is most sensitive when one sits on the

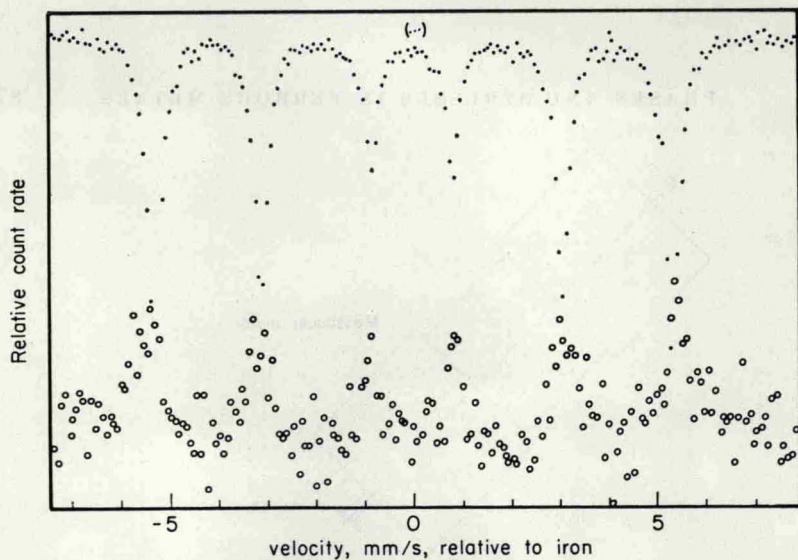


Figure 6. Relative speed of data acquisition, transmission vs. front-surface techniques. Upper: 0.0005" iron in transmission. Lower: 0.5" iron, front surface. Time: 53 minutes each.

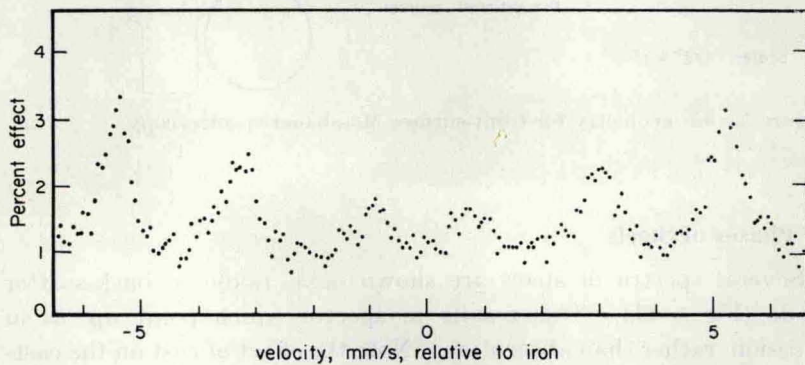


Figure 7. Armco iron.

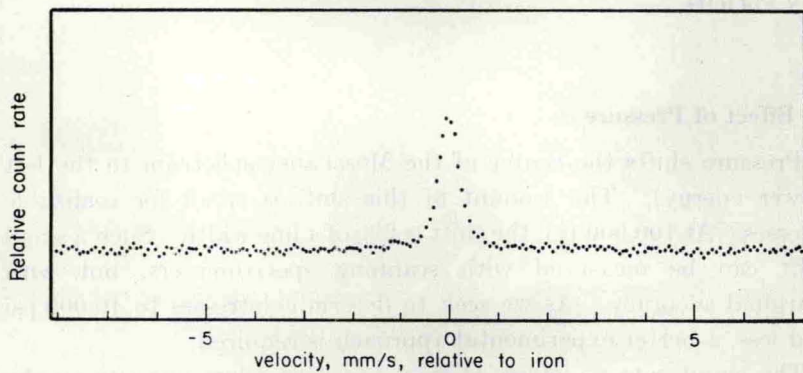


Figure 8. 304 stainless steel.