

Metallurgy of Basic Weld Metal

G. M. Evans & N. Bailey

Abington Publishing, London, 1997

432 Pages, Hardbound

At the outset, I don't know whether I am qualified to review this book. It is such an excellent work. But later I felt, I should describe the Book (not review) to Indian Welding fraternity so that every one can think of certainly reading the Book if not buying one for their reference collection.

The authors, both authorities in this field, have brought out something remarkable and a deep insight in the metallurgical aspects of very commonly used weld metals. I don't think there is any other book which deals so exclusively and exhaustively about ferritic steel manual metal arc weld metals. Those who are regular readers of Welding Journal of AWS would have read many of the articles of these authors published from time to time. Hats off to the authors who have been able to compile and publish twenty years (!) of research on this subject.

The book is divided into six chapters with an introduction. The authors describe the aim as

- i. Influence of compositional variations on mechanical properties of C-Mn weldmetal having less than 5% alloy addition.
- ii. Usage of these results to improve MMA electrodes.

- iii. Correlation &
- iv. Data base for weldmetal properties.

With the above, the various chapters describe in depth the effect of variations in composition on properties of weldmetal microstructure. Elements like Mn, Si, Nitrogen in C-Mn steel have been analysed extensively with a number of related variations in heat treatment etc. Graphical representations make the data clear and easily understandable. Effect of MMAW process variables have been analysed in depth to add another dimension to the analysis. Formulas for chemistry based mechanical property determinations have been indicated.

In analysing the low alloy steel weldmetals the effect of alloying additions and combinations have been studied. Various formulas available for determining weldmetal properties based on chemistry have been indicated.

There is a separate chapter for analysis on high purity weldmetals. While the earlier weldmetals contained normal levels of elements like Al, Nb, V, B, Ni, Cu, Mo, in these pure weldmetals, they were restricted as

- i. Al, B, Nb, V < 5 PPM each
- ii. Cu, Ni, Cr, N 0.03% each
- iii. Mo, N, 0.005%

The useful influence of the Ti has been brought out clearly in this chapter. Its combined effects with oxygen, nitrogen, Al and O₂ have been studied in depth.

Separate chapters have been devoted to microalloying of C-Mn weldmetals and high purity low alloy steel weldmetal. Even though metallographic studies go hand in hand in every chapter, a separate chapter describes more complex metallographic investigations.

The results described in this book are extensive and take into account a number of variables. A vast number of parameters under investigation makes the study interesting and useful for a number of situations. It is impossible to compile all the results in this description as the variants used are many.

In two words I can conclude that this book is a "MUST READ" for every welding engineer and should be referred to again and again for a better understanding of the properties of the weldmetal.