

THE COMMERCIAL TRIAL – PRODUCTION OF HRB400 REINFORCED BAR WITH V – N MICROALLOYING

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Abstract: The commercial trial production of V – N microalloyed HRB400 reinforced bar in Magang is presented. The composition of the reinforced bar, the microalloying process and the relation between specification and structural property are studied. The nitrogen – enhancing and strengthening effect of the V – N alloy is analyzed.

Key Words: V – N alloy; reinforced bar; microalloying; strength

1 Preface

The II class hot rolled ribbed steel bar of 335 MPa grade produced with 20MnSi steel is still widely used in China, while high strength hot rolled ribbed bar of 400 MPa, 460 MPa and 500 MPa grade has already been generally used in overseas construction industry. With high strength, stable performance, large safety reserve, good anti – vibration, low consumption and easy handling, the high strength hot rolled ribbed bar is more suitable for the construction of super – high building, big – spanned and anti – vibration structure. Its application can bring great economic and social benefits. In order to upgrade the construction steel and catch up with the international standards for reinforced steel products, China is making great efforts to promote the application of HRB400 reinforced bar.

As the production base for construction steel in China, Ma'anshan Steel produces over 1.0 million tons of hot rolled ribbed bar annually, of which 1.6×10^5 tons is of HRB400 grade, and the percentage is ever increasing. Its HRB400 rein-

forced bar has been used in some national key projects such as Tianwan nuclear power plant, Runyang bridge and multi – storey building in Guangdong province, the high quality has been confirmed by customers. In the past, the process of microalloying with ferrovanadium addition had been used in Ma'anshan Steel to produce HRB400 reinforced bar. In order to lower the cost, Ma'anshan Steel has been developing HRB400 reinforced bar using V – N microalloying, and by now it has successfully been put into batch production. The property of the product is stable and the cost is lower.

2 Commercially Trial Production of HRB400 Reinforced Bar with V – N Microalloying

2.1 The composition and required properties of HRB400 reinforced bar

The Chinese national standard GB1499 – 1998 is implemented for HRB400 reinforced bar production. The required chemical composition, mechanical behaviors and processing properties are showed in table 1. Good weldability and fatigue – resistance are also required for HRB400 reinforced bar.