

焊管生产过程工序质量动态管理

王高田

(太钢集团临汾钢铁有限公司)

摘要 通过对焊管生产特点及信息流对物流影响的分析,提出了整合焊管工序,建立工序动态质量信息系统的方法,从而及时改进工序质量,减少工序不良品,确保物流畅通。

关键词 焊管 生产过程 工序质量 动态管理

0 前言

焊管产品的形成伴随着两个动态过程:物流和信息流。物流是指原料投入后经过中间一系列加工工序最终成为产品的全过程。信息流是指工序质量信息从传递到接受、处理和反馈的整个过程,它伴随物流产生并反过来对物流起作用。物流和信息流是相辅相成的,信息随着物品的运动要及时流通和反馈。焊管生产是由一系列相互联系的工序来完成的。产品最终质量是靠各个工序质量来保证的。在生产过程中,上下道工序质量信息不能及时流通或质量信息与物流相脱节,工序质量就不能够及时和有效提高,会导致焊管生产流程不畅,影响正常生产。

1 我厂质量控制现状及存在的问题

我厂产品质量控制采取工序自检和专检,各个工序的质量状况由操作者根据产品执行标准有关条款进行自我判定,产品最终质量由专职检验员进行检验认定。生产过程中,各个工序质量记录不随产品传递,本工序自检认为有缺陷的产品在缺陷处用白色粉笔做标记,再由相关工序进行处理。这种工序管理办法有以下弊端:

(1) 工序质量由操作者自检,产品质量最终由专职检验员认定。上下道工序质量信息缺乏沟通,操作者不能及时调整操作方法,容易增加返修次数,产生不合格品。

(2) 工序质量问题仅用白色粉笔在钢管上做了简单标记,而钢管生产采用流水作业,钢管在流

转到下道工序过程中有的要经过输送辊道和台架,到相关工序时有的标记不好辨认,容易造成漏处理,使未经处理钢管进入了下道工序。

(3) 生产工序之间质量信息缺乏沟通,每班生产结束开班后会时才进行相互通报,延误了工序质量控制的最佳时间。

2 动态质量信息系统的建立和实施

2.1 整合工序

焊管生产作业方式为流水线,要实现每根钢管质量信息的及时流通和反馈,最理想的方法是:在生产过程中,每一根钢管的每道工序都做标记,质量情况都有相应的跟踪记录传票。因焊管生产工序多,每班生产钢管数量多,这样一来容易造成钢管上标记内容多,工序质量传票数量多。焊管各个工序操作环境有较大差异,有的工序受操作环境的限制,实际运作起来困难较大。

通过对焊管生产工艺流程的分析,我们发现对工序进行整合,可以使动态质量控制系统更加合理、有效,原则是:把工序连接紧密,工序作业场所距离较近的多个上下道工序合并为一个大的工序区,既解决了原来工序环节多,传递信息繁琐,又可以实现工序之间信息的流通和反馈。

按照上述原则,将焊管生产过程中的 15 个工序整合为三个工序区:成型工序区、精整工序区、检测工序区。焊管生产工艺流程为:原料上卷 剪切头尾 对接 递送 成型 焊接 定尺切割 平头 倒棱 修磨 补焊 水压试验 无损检验 最终检验 标志、入库。其中原料上卷到定

尺切割为成型工序区,平头到补焊为精整工序区,水压试验到标志、入库为检测工序区。

2.2 完善工序管理

首先,对每个工序制定《工序作业规范》,明确工作内容、工作要求、工作程序及遇到质量问题时的处理办法。其次,每个工序区确定一名质量联络员,负责本工序区质量信息的收集、传递和反馈工作。工序区质量信息流通如图 1 所示。

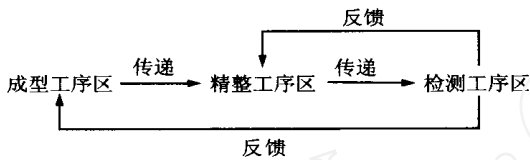


图 1 信息流通示意图

2.3 强化信息管理

2.3.1 规范钢管标记

在钢管外表面上标记的内容、符号、位置和由

谁来标记,制定明确的管理办法,形成一种固定模式,提高信息的可识别度和利用效率,钢管常见缺陷标记符号见表 1。

2.3.2 实施工序区质量通报单

钢管上所做的标记内容不可能太多,在钢管输送过程中标记的符号可能会模糊或遗失,工序质量通报单可以弥补上述不足,使反映的问题更明白。每个工序区根据各自工作性质和内容,确定本工序向相关工序通报的内容,设计不同的工序区质量通报单。工序区质量通报单由工序区质量联络员填写,本工序自留一份,送相关工序区质量联络员一份。每班生产时成型工序区先开始作业,经过一定时间后钢管逐步进入精整工序区,然后进入检测工序区。钢管在每个区都滞留一定时间,为了不影响工序信息的及时流转,适当减少传递单数量,可根据机组生产节奏,将钢管按一定数量编组。我厂每 5 根钢管编为一组,成型工序区质量通报单见表 2。

表 1 钢管常见缺陷标记符号

类别	漏焊	压(划)痕	未焊透	咬边	夹杂	渗漏	裂缝	其它
符号								
图形样式	矩形框	椭圆形框	三角形	波浪线	交叉直线	两条竖线	直线	文字说明
标注位置	形成包围	形成包围	上面	旁边	旁边	两边	旁边	

表 2 成型工序区质量通报单

规格:φ325 mm ×6 mm 钢质:Q235A 班次:甲 日期:2003 年 3 月 12 日 编号:L G/JL-06-03-012

钢管批号管号	工序质量完成情况及遗留问题						
	管径/mm	未焊透几处	漏焊几处	椭圆度/mm	划(压)痕几处	咬边几处	其它说明
2-15	1010		1	325、324			中(部)
2-16	1010			325、325			
2-17	1010			325、324		1	端(部)
2-18	1010			325、325			
2-19	1010			325、325			

传递人: × × ×

接收人: × × ×

4 结 语

动态质量信息系统实现了动态闭环管理。上、下道工序间能及时相互了解处理结果,操作人员能及时改进工作,采取纠正和预防措施,提高了工作效率和工序质量。信息流每一次循环都能使工序质量呈螺旋式上升,推动物流的高效流通。

作者 王高田,男,1965 年生,毕业于鞍山钢铁学院,工程师。现从事螺旋焊管、直缝焊管生产技术的研究和钢管质量控制工作。通讯地址:山西省太钢集团临汾钢铁有限公司焊管厂生产技术科 邮编:041000 电话:0357-2190017

(收稿日期:2003-07-18)

编辑 谢淑霞

method to servicing rollers and former rollers and increases the utilization rate of rollers and reduces the consumption of rollers accordingly.

Key words :welded pipe roller sharing control
Improvement of Coil UT Inspection Equipment of SAW Pipe Unit

Chen Qiwei, Liu Lianqi(62)

Abstract :The coil ultrasonic inspection for welded pipe is an important procedure during the production of Spiral welded pipe. Through analyzing the existed disadvantage and shortage of original coil inspection equipment during the application of lamination inspection to pipe parent metal ,it puts forward the improving scheme. The probe transverse movement adopts hydraulic driven ;The probe vertical movement adopts double oil cylinder driven ;The guidance parts adjusts by eccentricity shaft ;The whole stand is instead of section steel welded parts. The improved full hydraulic driven type coil inspection equipment has simple structure ,light weight ,flexible and reliable probe adjustment and highly whole intensify and stiffness as well as good use effect.

Key words :welding pipe unit coil Inspection unit improvement

Use Technique of Strip Splitting Production Line

Zhai Hui(64)

Blind Area Elimination of X Ray Industrial TV Inspection on SSAW Pipe

Wang Shuren, ZhuDaquan(65)

Abstract :Aim to the existed blind area problem of pipe ends during the inspection of X ray industrial TV Inspection system of SSAW pipe line ,it analyzes the cause of blind area as follows:1) X ray dispersion;2) remained magnetic particle on pipe ends;It puts forward the specific method of eliminating blind area as follows:1) pipe ends radiographing;2) image shelter unit ;3) Magnetic field rectifying unit. This makes the inspection system can meet the requirement of 100 % whole weld inspection.

Key words :spiral welded pipe X ray inspection blind area elimination

Selection Guide and Theory Basis of Welding Material for High Pressure Transmission Steel Pipeline

Zhen Zhaodong, Gao Lei, Song Tianxu(67)

Abstract :It discusses selection guide and its related theory basis of welding material for high-pressure transmission steel pipeline combined the experience of actual project and corresponding international specification ,the distortion characteristics, fracture mechanics and strength matching during the pipeline welding ,etc. .

Key words :pipeline welding selection of welding material theory basis strength matching fracture mechanics analysis

The Relation Between Geometrical Shape of Oil Tank Body and Welding

Chen Bin, Shang Li(70)

Abstract :It introduces the classification and its composition of vertical cylinder shape steel welding oil tank and analyses the relation between geometrical shape of oil tank body and welding construction of oil tank. It describes the welding sequence and welding method of tank parts during welding , etc. .

Key words :vertical cylinder shape steel welding oil tank geometrical shape welding relation

Welding Construction Measures Taken on Atrocious Weather

Zhao Jinhui(72)

Abstract :The bad weather is one of the key factors that affect the quality of welding during petrochemical project construction. The atrocious weather makes the electrodes affect

ed with damp ,pipe ends bevel rusting and increase the hydrogen diffusion chance in welding metal and it is easy to produce welding defects and deteriorate the mechanic property of welding metal. Therefore ,it is necessary to adopt preventive measures and strict control of electrode usage to insure the welding quality.

Key words :site welding atrocious weather effect and preventive measure

Procedure Quality Dynamic Control of Welded Pipe Production Process

Wang Gaotian(74)

Abstract :Through analysis to the characteristic of welded pipe and goods flow influenced by information flow ,it suggests to consist the procedure of welded pipe and establish the method of procedure dynamic quality information system in order to timely improve the procedure quality ,reduce the procedure badness and insure goods flow free.

Key words :welded pipe production process procedure quality dynamic control

Study of Applying ERW Pipe Technical Specification in City Natural Gas Pipeline Net

Sun Yongxi(76)

Abstract :It considers the main process parameter of ERW pipe must be standardized to avoid quality overmuch and increase the nullification investment and put forward some advice and opinion to the design of city gas pipe under the analysis of some special requirement of the composition of gas transmitted by pipeline ,environment conditions and natural gas to ERW pipe.

Key words :natural gas net ERW pipe technical specification study

Discussion on Several Ordinary Problems on Additional Technical Conditions of P. O. of SSAW Pipe for Oil and Gas Transmision

Qiao Xiaotang(81)

Abstract :It analyzes practical application requirement of pipe and quality level which can be obtained from production procedure technology of pipe and discusses the technical conditions which not only can meet application requirements of pipeline but also can all accept by each party aim to the ordinary arouse disputed problems of upper and lower limit of yield strength ,yield/ tensile ratio ,toughness ,time of X ray inspection and hydrostatic test burst test as well as pipe ends dimensions and process defects ,etc. .

Key words :spiral seam submerged arc welded pipe oil and gas transmission technical conditions addition application performance process quality level

The Strength Characteristic of High Grade Gas Transmission Pipeline Steel

Translate and edit by Li Xiaohong, Xinxixian(85)

Abstract :In recent ten years ,pipeline steel technology also made great development through the augmentation of natural gas consumption. It is very important for pipeline to safely and economic transmission of natural gas ,for example ,it requires the pipeline WT and high toughness to deep water pipeline of offing gas field ,and long distance gas transmission pipeline requires above X80 grade pipeline strength to reduce the gas transmission cost. To meet the above requirements of safety and economic ,steel making technology gains sufficient development ,therefore X100 Grade gained further study. However ,it still need to further study all characteristics of X100 grade ,such as characteristic of distortion action ,welding design ,dynamic ductibility fracture crack arrest ,the property of pipe material and X100 pipeline construction specification for the X100 grade pipe applied on the construction of pipeline.

Key words :pipeline steel X80 X100 characteristics