

机械定尺飞锯的设计

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关键词: 飞锯; 机械定尺; 焊管; 气缸

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在文献 [1] 和文献 [2] 两篇文章中, 笔者对飞锯应用机械定尺的方法从理论上进行了探讨和分析。本篇重点介绍机械定尺飞锯的设计、调整及应用时需注意的问题。

1 机械定尺飞锯设备简介

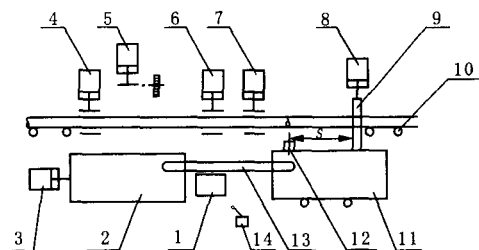
机械定尺飞锯是在原来的气动飞锯机基础上增加一个定尺小车和两个压紧辊装置, 主要由锯切小车和定尺小车两部分组成。定尺小车由接近开关和气缸控制的活动挡板组成, 这两部分用钢管刚性联接起来, 成为一体, 挡板与锯片之间的距离为要求的定尺长度。

机械定尺飞锯结构示意图见图 1。动作过程是: 当钢管运行接触到发讯开关 12, 发讯开关指令夹紧气缸 4 动作, 同时行走气缸 1 牵引锯切小车行走, 缓冲气缸 3 同步助推, 两台压紧防弯气缸 6、7 同时压下, 不让钢管上下弹跳, 只沿水平方向行走。钢管运行一段距离之后, 钢管与锯车达

到同步, 钳口同时也已夹紧, 碰撞活动挡板 9, 接近开关发讯, 锯切气缸 5 动作实现锯切。锯切完成延时一段时间, 锯片抬起, 同时指令夹紧气缸 4、压紧防弯气缸 6、7 同时抬起, 完成定尺锯切的全部动作, 锯切后的定尺管离开飞锯沿辊道前进到下一步工序, 钢管离开活动挡板, 活动挡板复位, 同时锯切小车回复原位静止, 缓冲气缸起缓冲作用, 锯车在原始位置上停止, 等待下一根钢管的锯切。

2 系统的调整

飞锯机的调整主要是调整两个速度: 一是锯车的给定速度, 二是锯车的返回速度。前者可通过调整行走气缸的单向阀, 使锯车的给定速度接近焊管的焊速, 但稍低于焊速。后者的调整, 返程时要有节流起缓冲作用, 同时缓冲气缸还要有快速排气阀, 保证快速排气, 使锯切小车返回后迅速复位, 防止振动不定位。另外, 在焊管生产速度确定的情况下, 锯车的加速度大小可通过调整缓冲气缸的推力来改变, 但推力不可过大, 否则会造成锯切时间不够, 易打碎锯片。最后, 在调整时还需注意, 当小车和焊管同步时, 焊管所走过的距离与小车所走过的距离之差越小越好, 这样焊管对挡板的冲击力就越小, 锯车越平稳, 定尺精度也越高, 同时, 锯切时也越省力。



1—行走气缸 2—飞锯小车 3—缓冲气缸 4—夹紧装置
5—锯切气缸 6、7—压紧装置 8—定尺挡板气缸
9—定尺挡板 10—输送辊 11—定尺小车 12—发讯开关
13—连接杆 14—极限开关

图 1 机械定尺飞锯结构示意图

3 设计中需注意的问题

(1) 锯切小车与定尺小车之间要刚性联接且稳固, 一般多用 $\phi 50$ mm 钢管制作。

运用仿形原理解决 铣边机自动跟踪问题的探讨

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关键词: 厚壁钢管; 焊接坡口; 铣边机; 仿形原理; 自动跟踪

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1 问题的提出

在厚壁(厚度大于 10 mm)螺旋埋弧焊管的制造过程中,钢板两侧边的加工一般分两步进行:第一步,用圆盘剪或铣边机将钢板板宽加工到工艺确定的工作宽度;第二步,用刨边机或铣边机将钢板两侧边加工出焊接要求的坡口。实践证明,

用铣边机加工坡口,其精度优于刨边机。铣边机不但可以加工出 V 形坡口(相对比较薄的钢板),而且还可以加工出 X 形坡口(相对比较厚的钢板),因此用铣边机加工坡口将成为大口径焊管机组的发展趋势。

然而,由于制造钢管所用的原材料——带钢在轧制过程中所产生的月牙弯的存在(当然这种误

(2)锯切小规格钢管时因钢管刚性差,易弯曲,从而影响定尺精度,需多增加防弯压辊。

(3)夹紧装置尽量采用卧式结构,且夹紧力要大,因立式结构使车体重心偏高,运行不稳定,从而影响定尺精度。

(4)气源压力要稳定可靠,才能准确、协调完成飞锯机的各项动作,保证定尺精度的准确和生产的连续。

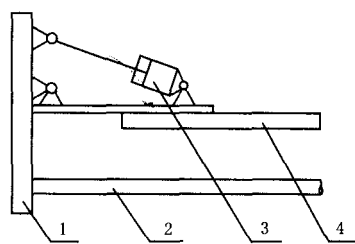
(5)由于定尺挡板需要承受钢管的冲击,同时,在切断完成后又需及时让开,以便顺利输出被切断的钢管,因此,可考虑利用杠杆原理采用翻板机构,如图 2 所示,在定长杆的上方设一支点,在支点的上方安装挡板气缸。

4 结 语

飞锯机采用机械定尺方法,不仅在理论上可验证,经实践检验也是可行的,特别在生产速度 40~60 m/min 时,精度最佳,一般精度在 0~10 mm,甚至可达 0~6 mm。并且制造容易,投资少,调整灵活,特别适合中小型企业锯切设备的改造。在目前市场经济条件下,争取小投资改造现有设备,提高产品质量,生产出用户满意、符合国家标准的产品,无疑是广大焊管厂家迫切追求的。

参考文献:

- [1] 宋正和,熊月善.在线机械定尺飞锯可行性探讨[J].焊管,2003(6):41-42
- [2] 宋正和.飞锯应用机械定尺的运动分析及计算[J].焊管,2004(2):27-30



1—挡板 2—钢管 3—气缸 4—定长杆

图 2 定尺挡板结构示意图

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Abstract D: 1001-3938(2005)01-0045-EA

Design of Inclined Set Flat Ellipse Pass

CAO Guo-fu

Abstract: The existed defects of flat ellipse pass with present "horizontal out" and "vertical out" is explained and the advantage of tilt installed flat ellipse pass, especially the distinct strong point in controlling weld seam position, prolonging the usage life of rollers as well as operating and commissioning, etc. is indicated. The new design principles of un-specific assign plastic allowance, design pass length with nominal length directly and decide tilt installed angles according to ratio of width and highness etc. is raised with design of example. Now there are many sets tilt installed flat ellipse rollers putting into production with prominence strongpoint.

Key words: tilt installed flat ellipse; pass design; tilted angle; weld seam position

Abstract D: 1001-3938(2005)01-0049-EA

Design of Mechanical Fix-Length Flying Saw

SONG Zheng-he

Key words: flying saw; mechanical fix-length; welded pipe; cylinder

Abstract D: 1001-3938(2005)01-0050-EA

Discussion to Solve the Automatic Tracking Problem of Milling Machine by Profile Modeling

ZHANG Ya-bin, ZHANG Ya-ping, TANG Jun

Key words: thick wall thickness steel pipe; welding bevel; milling machine; profile modeling; automatic tracking

Abstract D: 1001-3938(2005)01-0052-EA

A Few Method to Reduce Roller Weariness

ZHANG Ji-ping

Key words: roller; pass; material; reasonable application; method

Abstract D: 1001-3938(2005)01-0054-EA

Measuring Tolerance Analysis of $R_{t0.5}$ Line Pipe Steel

WANG Shu-ren, CUI Zhi-xin

Abstract: It is pointed out that the measuring tolerance influenced by the power value tolerance of accelerating speed, test specimens shape dimensions, specimens eccentricity, specimens unevenness, tester as well as man-made and equipment, etc. And put forward the method of reduce tolerance through analysis of tolerance occurred during measuring specified total elongation stress value ($R_{t0.5}$) of X70 line pipe steel for Shaanjing 2nd pipeline project.

Key words: line pipe steel; $R_{t0.5}$; measuring tolerance

Abstract D: 1001-3938(2005)01-0057-EA

Improving Weld Quality of Nickel Pipe Using Argon Gas Shielded Cover

XU Hong-bin, WU Yan-nong, XU Zhao-xiang

Abstract: The welding properties and its impact factors of pure nickel is analyzed. Combined the application of actual work, the welding procedure of industrial pure nickel pipe is discussed. To avoid high temperature area serious problem of nickel oxygenized during welding using self-command argon gas shielded cover on the basis of TIG, meanwhile combine other protective measures and reasonable welding specification to improve the welding quality of nickel pipe distinctly.

Key words: industrial pure nickel pipe; shielded cover; welding quality

Abstract D: 1001-3938(2005)01-0059-EA

Controlling Welded Pipe Rolling Accuracy for Improving Welded Pipe Forming and Welding Quality

LUO Xun-you

Key words: control; welded pipe; accuracy; forming; welding quality

Abstract D: 1001-3938(2005)01-0061-EA

Grade X80 High Strength Line Pipe Under Acidity Conditions

Translated and edited by WANG Hui, ZHU Wei

Abstract: The new standpoint of reducing content Mn in steel, simultaneously adding proper amount of Cr in steel and adopting control cooling method after rolling to reduce the HIC sensitivity of steel in acid solution under guaranteeing obtained enough strength is raised through lab test and industrial test of grade X80 high strength steel for large size pipeline and UOE pipe under acid condition. Reducing the critical content Mn of HIC sensitivity and proper content Cr is obtained through test. The standpoint of controlling weld seam's maximum hardness to improve the anti SSC property of steel is also raised.

Key words: X80 line pipe steel; hydrogen induced crack; sulfureted hydrogen stress corrosion; segregation; low Cr; accelerating control cooling; weld seam