Research and Application of Multi Dimension Intelligent Quality Control System for Production Logistics Based on SNP

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Abstract. In this paper, we study the production logistics system based on SNP to improve the production process of roll package and establish reverse material tracking system. Through the construction of cigarette-packaging production logistics multidimensional model that based on the SNP to achieve production logistics multidimensional quality control, the minimum degree of single particle material batches and batches of package tracking and management tracing the whole process of production logistics.

Introduction

It is in transition from traditional lean manufacturing to intelligent manufacturing, the introduction of a large number of the cigarette factory in the world leading level of ultrahigh speed cigarette packing equipment (production capacity of 20000 ton / min) and filter rod molding equipment (production capacity of 1000 meters / minute) in the "11th Five-Year" technical innovation. And a large number of applications of automatic logistic equipment such as the industrial robot, stacker and laser guided trolley realize the automatic storage and automatic transmission, automatic sorting and stacking for cigarette production process of raw materials, semi-finished products and finished products.

At present domestic and international, the vast majority of quality control and tracking is based on two dimensions of material and time, also on batch traceability and whole process traceability. Under this background, the research of intelligent logistics package production process quality control and with minimal packaging unit (SNP) for the whole process of tracking and tracing object is a further study on the quality of refinement.

Production Logistics System Model

SNP stands for Standard Number of Packing, which is the smallest unit in quality tracking process during the production logistics. Packaging refers to the packing period of pasting label or packaging materials with RFID, such as palletized tipping paper, a box of trademarks paper (500) and a case of filter rod. [1]

The intelligent roll packing production logistics quality control system puts the SNP as the object, whose overall design ideas is to be able to carry out the whole process tracking, traceability and quality control, and whose basis is the original automated production logistics system, Identify, analysis, control and simulate the two-way tracking of the production logistics system when is oriented by SNP batch management, by all of which compromise the operation of artificial logistics. We establish this intelligent production logistics quality control system to achieve the logistics process of the roll packing production logistics process in advance, and after the accurate tracking and accurate tracking function, ultimately to achieve the purpose of effectively improving the quality of products. See the improvement model of production logistics system from Figure 1, the original manual supplement logistics operation and automatic production logistics system is distinguished, manual supplementary logistics operation does not enter the data into the system, cannot realize the analysis and the recognition of the pallet and the big ticket and the factory producing area, also the number and particle size to the pallet as a unit. But intelligent production logistics quality control system pallet can be identified and analyzed through the promotion of the
minimum packaging unit SNP logistics quality, artificial supplementary logistics operation also scan code into the system, and the implementation of related auxiliary large pallet. This system can realize the forward and backward tracing of materials. [2]

Figure 1. Production logistics system model.

In order to enhance quality control ability of the production logistics process, realize the whole process of material tracking, analysis the process of the production logistics package, with auxiliary process is illustrated in Figure 2, we can see that work flow from the match pallet to the auxiliary storage. At the first, in the form of SNP scan code should be done for placing and releasing that auxiliary from the storage. When the release instruction is issued on the machine, the automated warehouse of auxiliary materials received the instruction and sent out the goods. There is a control point in this process that produced in match region, wrapping production of artificial materials is on the table scan code link auxiliary production before the last physical position changes, so it is necessary to identify the control.

![Figure 2. Production logistics process optimization example diagram.](image)

In the retrospective process, it must be required to have the relevant information about the material that to be entered in the production logistics, and set the relevant identification and control points, identification is to identify the material, and the control points to control the quality. We set, the output process interval time is less than 10 minutes, the recognition and control function of the process will be canceled. According to the maximum efficiency of the process design, the material morphology remains unchanged and only the displacement flow of the follow-up process can only be identified, not be controlled. Similarly, artificial auxiliary distribution links do not need to identify and control functions. But in order to ensure the stability of the system, the original function as far as possible to maintain the same, so the control point only to do adaptive adjustment, retain the original control function, because the auxiliary material storage is the original control point. Auxiliary materials warehousing process and the delivery process although the time interval
is greater than 8 hours, but there is a system of automated warehouse security, this two link will not produce material errors.

In the reverse tracing process of materials, finished products that BB and AA produced are found to mix together in automated warehouse of finished products. In general, a finished pallet is only one product but can be more than one production unit produce. When finding the issue of SBLQ1’s trademark paper, need to release all of finished production pallets which have been through this palletizing channel, the problematic product would isolate from other production units through manual sorting. If the establishment of a one-to-one correspondence between the sealing machine and palletizing channel, that only one channel can be finished stacking palletizing in reverse material tracking.

Multi Dimension Precision Traceability Model of Roll Packing Production Based on SNP

The quality tracing method are explored after the completion of the whole process of the production logistics system upgrade and the whole process of material tracking and tracing. In product quality traceability system, the production always be traced by the material dimension or time dimension. In the package production inside, for a SNP object, can accurately know the storage time for the production of feed storage time and the final time. If it is matched between start and end interval of material production with the production of the corresponding time, the result of matching accuracy will be relatively low. But reduce the production time and the end time of the product to the working order, divide the production process time in accordance with the process, the accuracy of the result is greatly increased. [3]
Based on the time-based matching, the constraints are combined to analyze the time crossing points of different processes, and the matching accuracy is improved. [4] On this basis, put forward a SNP package production logistics multi-dimensional accurate traceability model based on Figure 4, the horizontal axis represents each time point, the vertical axis represents the space, the third axis represents material batches. If you are in the manufacturing process, each of the small boxes in the middle of the package, said at a certain time, the production machine for the processing of raw materials and produce a specific semi-finished products or finished products. The graph shows how the material, the product, the time and the machine are connected, and the trajectory of the material is changed during the process by using the 3D positioning unit.

Successfully obtained the material in the space and time information of each point of the production logistics through the implementation of recording and different material minimum packaging unit, the basic conditions for the application of this model, intelligent package production logistics quality control system is developed, which realize the package production the whole process of material precision tracking and accurate traceability.

The quality control of cigarette production process has been further improved by applying intelligent logistics package production quality control system, the product quality control extends from production to the whole process of production logistics, and material commodity management refined as the particle size of the material management of SNP. It has been true that realize the whole process of the material finetexting, greatly reduce the scope of quality traceability, initiative, greatly reduce the probability of the generation of nonconforming products, reduce the cost of quality control. Through the data show that in each shift has a warehouse, in 2015 a total of 442 processing orders, 361 for the large-scale brand processing, the daily handling of single: 442/250 (day) * (362/442) =1.44. If the average time in 2015 to turn over 3 people, scrapped 16 cigarettes, then the time is 2 hours, large-scale brand production 142 days. The 2015 mass production traceability number: 142*1.44 (day) +142*3 (process) =630.48. After the application of intelligent quality control, each time can be reduced by 45.9%. 2015 to reduce the workload of turnover: 630.48*2 (hours) *3 (people) 45.9%/ (1-45.9%) =401.19 person days. Save labor costs 321 thousand yuan.

**Conclusion**

Through the combination of materials, products, and time machine, mastered the SNP material in the change processing and circulation process, created an intelligent production logistics control system that based on the SNP package production logistics multi-dimensional accurate traceability
model, realized the SNP quality intelligent object wrap the whole production process of logistics, quality tracking and tracing error, all of these will effectively enhance the quality control technology of production logistics of cigarette industry and fill the automation, intelligent production logistics links to SNP as the object of the material tracking and tracing of the blank.

References

[1] China Tobacco Zhejiang Industrial Co. LTD., Key technologies and application of supporting of all materials of the whole cigarette supply chain with standard number of packing for tracking and traceability.

