

## **Optimization for Recycled Scrap System of Prebaked Anode**

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**Abstract:** Process optimization for the system planning and equipment configuration of the recycled scraps system for the production of prebaked anode was carried out, combining with the current prebaked anode carbon production, from the view of the final product quality and cost control of one company brought into production in July 2012 with the output of 250 thousand tons. The practical results showed that the recycled scraps system after optimization could run smoothly for a long period.

**Key words:** Prebaked anode; process optimization; automatic control; recycled scraps

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### **Configuration of the recycled scrap processing system before optimization**

Each aluminum anode manufacturing enterprise in the implementation of the recycled scrap system configuration is different in equipment selection, but basically it has the same overall goal, mainly to process waste products, waste and scrap final anode products, raw broken into residual pole broken into pieces and cooked anode production line again. Taking a company 250 000 t prebaked anode production line, for example, in Figure 1 of the project expected to return to the selection of equipment design configuration.

In Figure 1, S1 is ordinary double girder lifting equipment; S2 is 500 t hydraulic breakers; S3, S9, S12 for the feeder; S4, S10, S42, S43, S44 as belt conveyors; S5, S11 is Separators; S6, S13 as crusher; S7, S14 as bucket elevators; S8 is a jaw crusher.

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As seen from Figure 1, there are two production lines in their production design. When the control room issued a start command of crushing residual pole. the residual polar system equipment by S43-S14-S13-S12-S11-S10-S9-S8 in sequence automatically then you can start adding electrolysis from jaw crusher crushing polar residues returned to start, and then through the belt, magnetic separator iron, vibrating feeder, crusher, bucket elevator into the residual polar silos; among when the control room issued 500 t of waste raw crusher, scrap pieces or cooked paste of crushed waste discharge start command, the system equipment by S44-S42-S7-S6-S5-S4-S3-S2 in sequence automatically start this time by ordinary double girder crane hydraulic breakers to 500 t of waste added raw and cooked paste of crushed charcoal or waste began, material crushed by a belt, magnetic separator iron, crusher, bucket elevator enters butts or raw chopped silo.

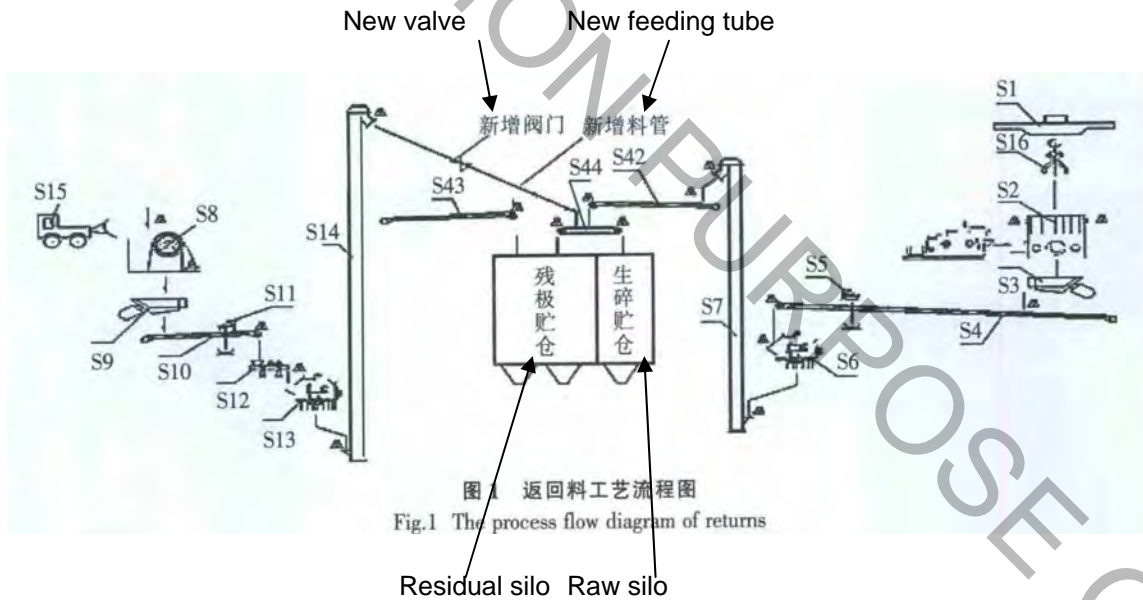


Figure 1: The process flow diagram of returns

### Optimization process

As can be seen from the control program before optimization, after this jaw crusher broken line all the equipment ready for the start button SB101 polar residues crushing production line through a soft button in the control room Canji-Auto-Start-HMI or field start. After starting the normal equipment operation signal corresponding to the control program feedback line 17, the display device is operating normally. Then begin to enter the residue of a very broken electrolysis return to work status.

Table 1 Jaw crusher capacity contrast before and after improvement

	Before improvement	After improvement
Crushing material category	Residual pole	Raw and processed waste blocks of certain specifications, waste paste, residual pole
Crushing capacity	Residual pole 130 t/d	Processed waste blocks of certain specifications, residual pole 130 t/d
500 t when out of order	No crushing of raw waste blocks and waste paste	Raw waste blocks of certain specifications, waste paste, 130 t/d Can crush raw waste blocks and waste paste
500 t when not in full capacity	No balance of processed scraps (including residual pole) and raw scraps	Can balance the amounts of processed scraps (including residual pole) and raw scraps

### Conclusions

- 1) Handling and use of pre-baked anode production in return for the anode material production costs and quality play a crucial impact. Guaranteed to return to normal operation is a prerequisite for the anode material quality uniform.
- 2) By crushing production line in the residual polar increased cut pipe and electric valves, and run the appropriate change control procedures, open up a raw pieces of another production line.
- 3) Through the transformation, even if the original raw broken lines interrupted production, but also to ensure automatic feeding raw pieces of work. Actual production to meet demand, and verified by practice.