

Overhaul and Re-building of Precision Conveyor Chains

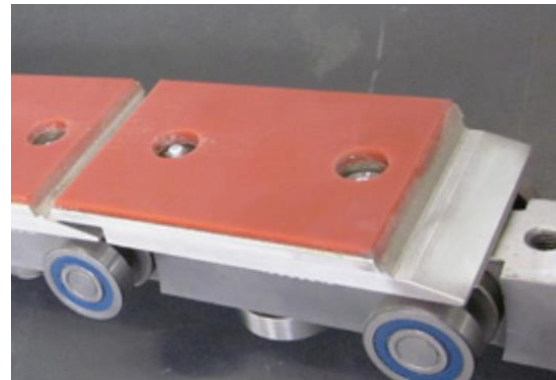
The feed system of a through-feed machine for production and processing of panel-based furniture parts consists (in most cases) of a conveyor chain which transports the workpiece lengthwise through the machine, along the various processing aggregates.

Whereas wear and tear of the conveyor chains in single-sided machines has no crucial consequences, this will look completely different if it comes to double-sided machines with sizing section. A synchronous run of the left- and right-hand side chains (to each other) is of utmost importance in order to stay within the required processing tolerances, like:

- **Sizing accuracy**
- **Parallel cut**
- **Angular (square) cut**

Typical machines for which this will apply are double end tenoners or combination (sizing and edge banding) machines, particularly for crosswise processing.

Also, for lengthwise through feed machines (e.g., so called 'Complete-Lines') the synchronous run of the two chains is of great importance, in order to prevent a 'climb-out' from the drive sprocket of one of the chains. This usually happens when running end- or seamless production - with a small or even no gap between the work pieces



Finally, the special double end tenoners for flooring production (sizing and profiling of laminate or parquet planks) need to be mentioned in this context. In this industry the required accuracies of the finished products are in a range of a few 1/100 mm only, so the feeding chains of the machines have to run absolutely and reliably precise.

Procedure

Accurate work attitude, paired with the necessary skills as well as usage of appropriate, suitable tools and equipment are indispensable requirements for a successful reconditioning of a precise chain



We acquired the necessary know-how by working many years in this service field. This enabled us to develop an own small machine with which the chains can be dismantled and re-assembled semi-automatically. Thanks to this device we are able to fulfil the high-quality standards consistently and reproducibly. Furthermore, the relevant working steps are recorded so that the results can be retraced at a later point of time.

Different levels of overhaul

Depending on the condition of the chains there are different levels of overhaul possible. In order to judge this and determine the required extend of service we recommend to start with an inspection on-site. This can be conducted by our technical staff or – in exceptional cases - by your maintenance staff who works off a few steps according to an inspection checklist provided by us. The extend of overhaul also depends on a few other parameters:

- for how long is the machine still intended to be used (with the existing chain)?
- what is the maximum down-time during which the service on-site has to be done?
- Is there urgent production currently which allows only a temporary repair first, and then plan another thorough overhaul at a later - scheduled - shut-down
- budget for the total overhaul

Each individual case will be judged and worked out together with the customer. This also includes preparation of a case-based quotation with a calculable price for the whole job.

The different steps or overhaul levels can be structured as follows:

1) At the machine, on-site

- (a) Dismantling of the chains into short sections or strings of equal lengths of approx. 1 m each. Thereafter measuring of the individual sections, recording and re-pairing (assembly) of the chains so that the same total lengths for left and right side are achieved. Pulling back the chains onto the machine, then testing and adjusting of the dogs (if any).

This is the **quickest, most simple and lowest-priced option**. Can be considered as a temporary measure, or in all cases where the wear and tear of the chains is still relatively low. The mobile chain measuring device need to be transported to the machine.



- (b) similar to (a) but including turning of the pins by 180 degrees. Thereby the so far not strained surface areas of the pins will take the load, and thus a quality level which comes close to that of a new chain can be achieved. Depending on shift-operation the chain can continue to be used for another 3 - 5 years.

More time-consuming and slightly higher costs than (a) since each joint between two links need to be worked on. In relation to the result and the expected life span of use definitely a very interesting option.

2) At our chain service

- (a) Dismantling of the chains from the machine and transportation to our chain service. This can be done either on a coiler (whole chain) or on palette / in a box by **splitting** the chain into short sections. Thereafter **measuring** of the individual sections, recording and **re-pairing** of the chains so that the **same total lengths** for left and right side are achieved. **Defective** parts like needle bearings, track rollers or seals will be **replaced**. After pre-assembly the chains are pulled onto coils and sent back to the customer. Pulling back the chains onto the machine, then testing and adjusting of the dogs (if any).

This is a **quick and relatively low-priced option**. Can be considered as a temporary measure, or in all cases where the wear and tear of the chains is still relatively low. The chains need to be transported to us and after the overhaul works back to the customer. Advantage: All special devices and tools are available in our workshop.



(b) similar to 1 (b), but the works to be conducted in our chain workshop.

Remark: Options 2 (a) and 2 (b) follow similar procedures with the same contents of work as 1 (a) and 1 (b). But it's possible to save some costs for engineers' work on-site if pulling-off of the chains from the machine and later on putting them back is conducted by the customer's maintenance staff.

(c) **Complete overhaul of the chains** at our chain workshop. Only the chain links (block links) of the 'old' chain are being re-used. All other parts, like pins, track rollers, needle bearings, seal rings, etc., will be replaced by new parts. **Substantially more time-consuming and also higher costs** than (a) or (b), but the quality of the so re-built chain is **as good as new**.



(d) - like (c), but we prepare a completely reconditioned (re-built) chain for you. This will be sent to the machine, where the old chain is pulled off, and then replaced by the new one. The old chain will be taken back in exchange against the new one.

This is **certainly very interesting**, because the down-time of the machine and thus the **loss of production** is **minimised**. With regards to **price similar to (c)**.



(e) New chain from the machine manufacturer.

High quality, with suppliers' warranty. Short down time, but by far most expensive option

Remark: Of course, the overhaul of the chains can be used – concurrently – to modify the dog pitch, e.g. from before 1000 mm distance to 500 mm distance. This is valid for all the options as per above description.

Cost calculation / overview:

The price range reaches from approx. **85.00 €/running meter (rm)** for options (a) up to approx. **520.00 €/rm** for option 2 (d), depending on the the following parameters:

- Type of chain (model), e.g. sliding chain ↔ rolling chain with runway and guiding bearings
- Chain with / without dogs
- Dog pitch (number of pairs of dogs per running meter)

In case the chain pads need to be replaced at the same time together with the chain body additional costs between **60,00 €/rm** and **80,00 €/rm** must be added, depending on type of chain pads.

The price indications for chain pads are not valid for flooring machines, because in many cases specially designed chain pads are being used. For flooring machines please contact us, so we can work out a solution for your specific chains and track pads.

As comparison: The price for a **new chain** from the machine manufacturer will be between approx. **900,00** and **1.200,00 €/rm**, depending on type of chain (with/without dogs, dog pitch, bearings, etc.).

Please contact us if you have a concrete case where the chains of your machines are making problems or if they need maintenance. Of course, it's also possible to arrange a visit on-site, at your factory to inspect your machine(s) and to discuss next steps and further procedures.



Sample of a measuring protocol:

Transportkette - Mess Protokoll

Kunde:

Maschine:

Hersteller:

Kettenlänge:

Kettenglied-Achsabstand:

Nockenteilung:

Mess-Methode:

Hinweis: Drehen der Kettenbolzen um 180°

LA - LINKS Alt (bisherige Position in Kette links)

RA - RECHTS Alt (bisherige Position in Kette rechts)

L[XX] - Neue Position in LINKER Kette

R[XX] - Neue Position in RECHTER Kette

KF 20/24/QA/30, No.: 0-202-99-9999

Homag

2 x 30m (60 m, 600 Kettenglieder)

100 mm

400 mm (4 Kettenglieder)

Pneumatische Zugspannung, 7 bar, Zyl.-Ø.: 100 mm, approx. 5.500 N

Messung einzelner Abschnitte von 1m Länge (10 Kettenglieder)

Nummer des Meterstücks	Wert vor	Wert danach	Platzierung nach Vermessen	Nummer des Meterstücks	Wert vor	Wert danach	Platzierung nach Vermessen
LA01	0,11	0,14	L 6	RA01	0,09	0,00	R 30
LA02	0,07	0,03	L 23	RA02	0,01	-0,01	R 1
LA03	0,09	0,02	R 24	RA03	0,04	0,01	L 30
LA04	0,07	0,10	L 5	RA04	0,04	-0,02	L 1
LA05	0,07	0,04	R 20	RA05	0,09	0,04	L 16
LA06	0,08	0,08	L 15	RA06	0,08	0,05	R 21
LA07	0,10	0,12	R 10	RA07	0,09	0,07	L 14
LA08	0,12	0,08	R 9	RA08	0,03	0,03	R 25
LA09	0,01	0,06	R 18	RA09	0,01	-0,02	R 2
LA10	0,28	0,23	L 3	RA10	0,00	0,03	R 23
LA11	0,08	0,04	R 16	RA11	0,09	0,09	L 8
LA12	0,14	0,02	L 27	RA12	0,07	0,09	R 15
LA13	0,04	0,10	L 4	RA13	0,03	0,02	L 22
LA14	0,05	0,03	L 25	RA14	0,03	0,03	R 19
LA15	0,13	0,06	L 12	RA15	0,03	0,02	L 24
LA16	0,13	0,07	L 17	RA16	0,02	0,09	R 11
LA17	0,08	0,03	L 26	RA17	0,00	0,00	L 28
LA18	0,09	0,02	R 27	RA18	0,13	0,14	R 5
LA19	0,19	0,09	R 8	RA19	0,00	0,16	R 4
LA20	0,14	0,07	R 17	RA20	0,00	0,09	L 9
LA21	0,09	0,02	R 26	RA21	0,08	0,07	L 18
LA22	0,11	0,03	L 19	RA22	0,10	0,09	R 7
LA23	0,06	0,01	R 28	RA23	0,12	0,07	R 14
LA24	0,05	0,00	L 29	RA24	0,06	0,07	L 13
LA25	0,13	-0,01	L 2	RA25	0,04	0,08	R 12
LA26	0,15	0,07	R 13	RA26	0,08	0,16	R 3
LA27	0,09	0,02	R 22	RA27	0,04	0,12	R 6
LA28	0,19	0,12	L 11	RA28	0,04	0,10	L 7
LA29	0,06	0,03	L 20	RA29	0,05	0,10	L 10
LA30	0,11	0,01	R 29	RA30	0,00	0,05	L 21

Gesamtlänge links: 3,11 1,73

Gesamtlänge LI: 0,67

Gesamtlänge rechts: 1,40 1,82

Gesamtlänge RE: 1,11

Nummer alt	Kette links	Kette rechts	Nummer alt
0,00	RA04	L 1	R 1
0,00	LA25	L 2	R 2
0,23	LA10	L 3	R 3
0,10	LA13	L 4	R 4
0,10	LA04	L 5	R 5
0,14	LA01	L 6	R 6
0,10	RA28	L 7	R 7
0,09	RA11	L 8	R 8
0,09	RA20	L 9	R 9
0,10	RA29	L 10	R 10
0,12	LA28	L 11	R 11
0,06	LA15	L 12	R 12
0,07	RA24	L 13	R 13
0,07	RA07	L 14	R 14
0,08	LA06	L 15	R 15
0,04	RA05	L 16	R 16
0,07	LA16	L 17	R 17
0,07	RA21	L 18	R 18
0,03	LA22	L 19	R 19
0,03	LA29	L 20	R 20
0,05	RA30	L 21	R 21
0,02	RA13	L 22	R 22
0,03	LA02	L 23	R 23
0,02	RA15	L 24	R 24
0,03	LA14	L 25	R 25
0,03	LA17	L 26	R 26
0,02	LA12	L 27	R 27
0,00	RA17	L 28	R 28
0,00	LA24	L 29	R 29
0,01	RA03	L 30	R 30

1,78

1,78