PREDICTIVE MAINTENANCE APP (FOR SOFTWARE RT-WIN 4)

Hörtig Rohrpost GmbH

Predictive Maintenance App: part of pneumatic tube software RT-Win 4

It is important to you, to have a pneumatic tube system with minimal downtime and low maintenance costs? Then you should pay special attention to the software behind the pneumatic tube system. Using a smart software with a predictive maintenance function gives you the opportunity to spot failures before they occur.

RT-Win 4 – the user software for Hörtig pneumatic tube systems – comes with a predictive maintenance function as an optional app. RT-Win 4 is a modular software that consists of four basic, and a variety of additional apps. These are booked by the customer depending on his/her needs.

- **Demand-oriented service**
- **Avert cost-intensive consequential damage**
- **Less spontaneous errors**
- **Higher system availability**

Optimizing maintenance through data processing

Predictive maintenance forecasts undesirable operating states of the pneumatic tube system. It does so based on statistical and mechanical experience gained. Sensors installed all over the pneumatic tube system collect data over various measure points.

This data is then used by our pneumatic tube software RT-Win 4 and its Predictive Maintenance App to evaluate events and to predict malfunctions in the carriers, the tube lines, and the drives. These are elements with high wear potential. In the case of critical events, the software triggers a visual alarm.

Using predictive maintenance, downtimes are reduced, as service technicians, spare parts and logistics can be provided in a targeted manner through appropriate diagnoses.

Process Predictive Maintenance App

Features of the Predictive Maintenance App

The Predictive Maintenance App clearly displays the recorded data for carrier wear, tube condition, and drive condition in tables and diagrams. In the event of a critical operating condition, it issues a visual warning. The warning is made clear by a signal yellow colour in the RT-Win software.

Predicting carrier wear

Carrier maintenance monitors the condition of the pneumatic tube carriers in use. For this purpose, the software uses various statistical and mechanical parameters, such as the number of transports made, the travel time, and the distance covered by the carrier. Furthermore, the wear of the carriers' rings is automatically measured during each journey.

If values deviate from the threshold values, a clear signal is sent to the software user. In this case, the carrier is automatically moved to the maintenance or washing station during the next empty run.

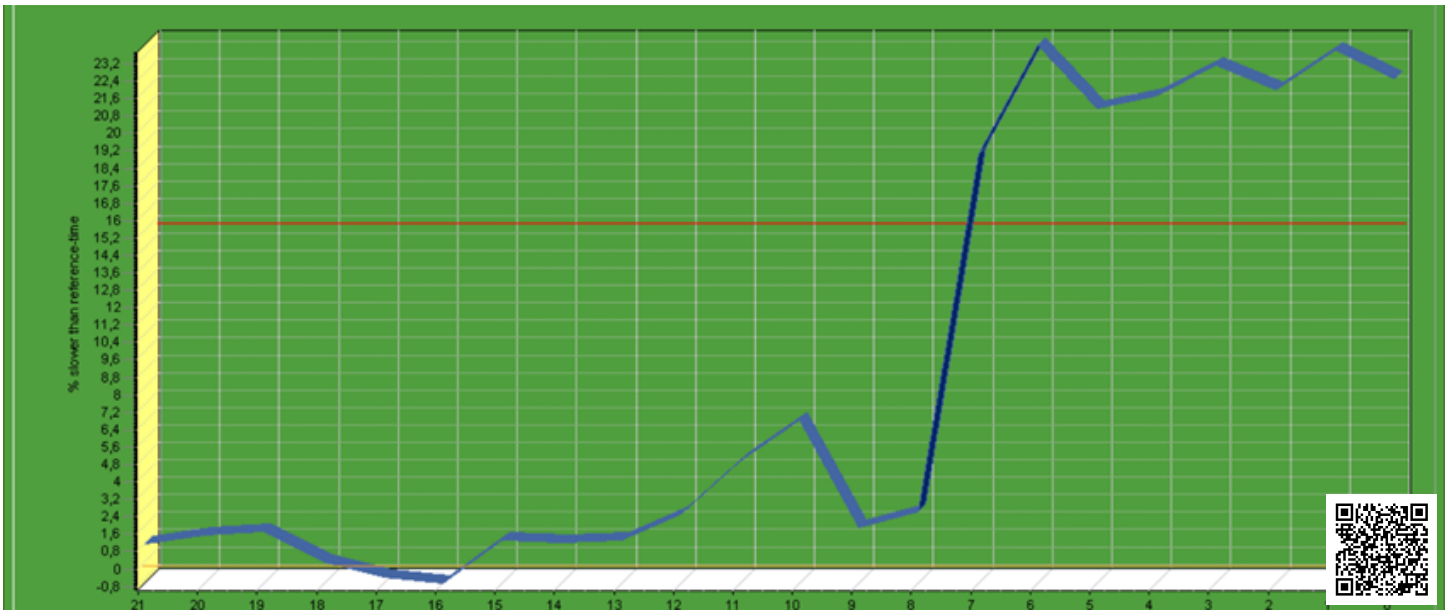
Predicting tube condition

The tube maintenance records the condition of the installed pneumatic tube lines. It detects leaks in the tube network and stuck pneumatic tube carriers based on parameters such as travel time or sudden pressure rises.

The software user can access all recorded values via detailed tables and diagrams. If a value deviates from the threshold, he receives a visual signal.

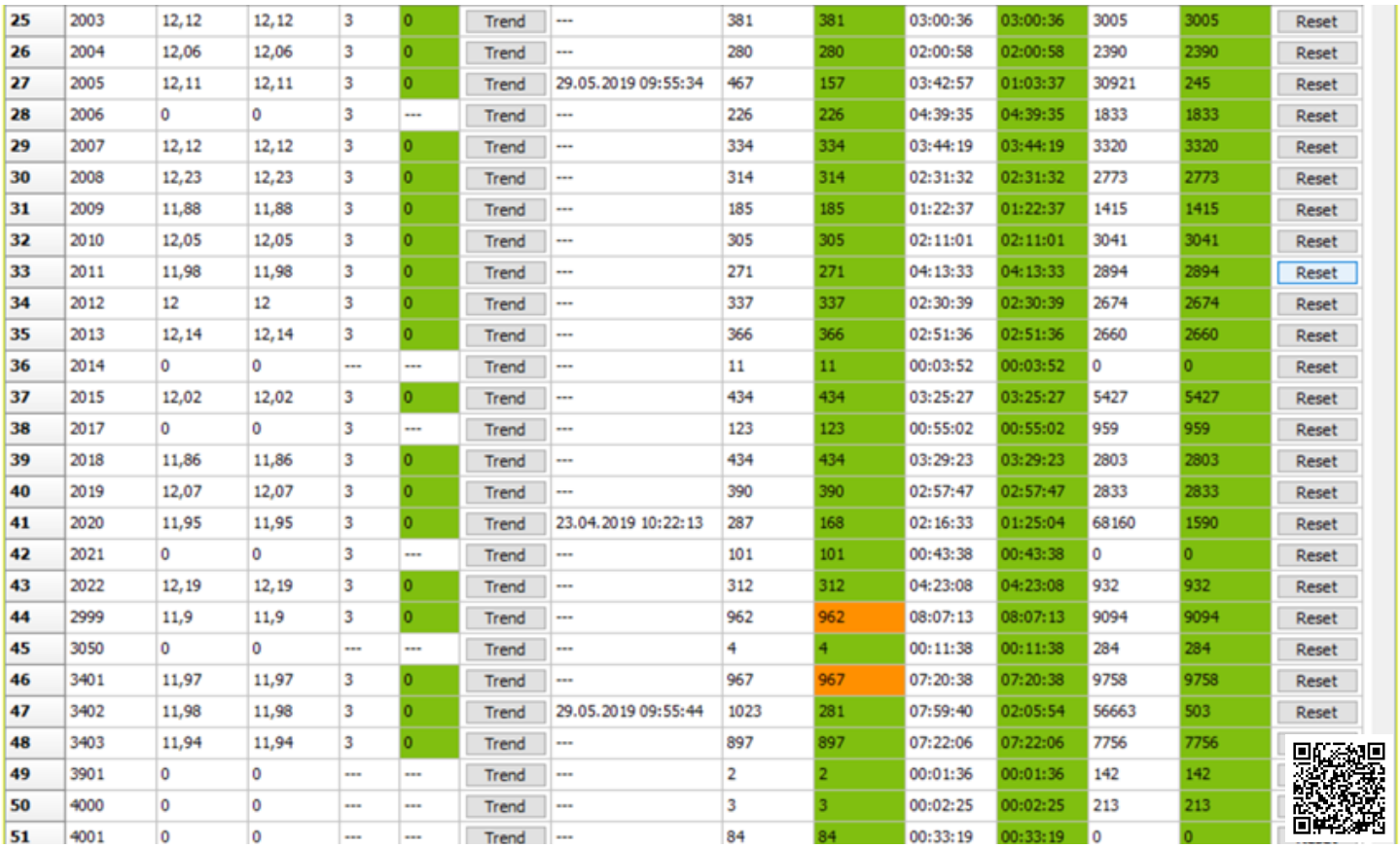
Predicting drive condition

The drive maintenance tracks the number of positions approached and the operating time of all drives in the system. The measured values are displayed in table and diagram form. If the parameters of a drive deviate, the user receives a visual signal.



Exemplary graph in the Predictive Maintenance App: Showing carrier trends

Predictive Maintenance App: Overview and carrier maintenance table



25	2003	12,12	12,12	3	0	Trend	---	381	381	03:00:36	03:00:36	3005	3005	Reset
26	2004	12,06	12,06	3	0	Trend	---	280	280	02:00:58	02:00:58	2390	2390	Reset
27	2005	12,11	12,11	3	0	Trend	29.05.2019 09:55:34	467	157	03:42:57	01:03:37	30921	245	Reset
28	2006	0	0	3	---	Trend	---	226	226	04:39:35	04:39:35	1833	1833	Reset
29	2007	12,12	12,12	3	0	Trend	---	334	334	03:44:19	03:44:19	3320	3320	Reset
30	2008	12,23	12,23	3	0	Trend	---	314	314	02:31:32	02:31:32	2773	2773	Reset
31	2009	11,88	11,88	3	0	Trend	---	185	185	01:22:37	01:22:37	1415	1415	Reset
32	2010	12,05	12,05	3	0	Trend	---	305	305	02:11:01	02:11:01	3041	3041	Reset
33	2011	11,98	11,98	3	0	Trend	---	271	271	04:13:33	04:13:33	2894	2894	Reset
34	2012	12	12	3	0	Trend	---	337	337	02:30:39	02:30:39	2674	2674	Reset
35	2013	12,14	12,14	3	0	Trend	---	366	366	02:51:36	02:51:36	2660	2660	Reset
36	2014	0	0	---	---	Trend	---	11	11	00:03:52	00:03:52	0	0	Reset
37	2015	12,02	12,02	3	0	Trend	---	434	434	03:25:27	03:25:27	5427	5427	Reset
38	2017	0	0	3	---	Trend	---	123	123	00:55:02	00:55:02	959	959	Reset
39	2018	11,86	11,86	3	0	Trend	---	434	434	03:29:23	03:29:23	2803	2803	Reset
40	2019	12,07	12,07	3	0	Trend	---	390	390	02:57:47	02:57:47	2833	2833	Reset
41	2020	11,95	11,95	3	0	Trend	23.04.2019 10:22:13	287	168	02:16:33	01:25:04	68160	1590	Reset
42	2021	0	0	3	---	Trend	---	101	101	00:43:38	00:43:38	0	0	Reset
43	2022	12,19	12,19	3	0	Trend	---	312	312	04:23:08	04:23:08	932	932	Reset
44	2999	11,9	11,9	3	0	Trend	---	962	962	08:07:13	08:07:13	9094	9094	Reset
45	3050	0	0	---	---	Trend	---	4	4	00:11:38	00:11:38	284	284	Reset
46	3401	11,97	11,97	3	0	Trend	---	967	967	07:20:38	07:20:38	9758	9758	Reset
47	3402	11,98	11,98	3	0	Trend	29.05.2019 09:55:44	1023	281	07:59:40	02:05:54	56663	503	Reset
48	3403	11,94	11,94	3	0	Trend	---	897	897	07:22:06	07:22:06	7756	7756	
49	3901	0	0	---	---	Trend	---	2	2	00:01:36	00:01:36	142	142	
50	4000	0	0	---	---	Trend	---	3	3	00:02:25	00:02:25	213	213	
51	4001	0	0	---	---	Trend	---	84	84	00:33:19	00:33:19	0	0	

Carrier maintenance: visual signal because two carrier's parameters deviate

Tube Race Tracks:

Nr.:	RS-Dev1	RS1	RS-Dev2	RS2	Zone	Blow-Dev	Blower-Direction	Tolerance [%]	Track-Length	min Pressure	max Pressure
1	Z54 W51	E	Z51 S22	B	54	4	suck	10	180	-100	100
2	Z64 W51	E	Z61 S22	B	64	4	suck	10	180	-100	100
3	Z112 W31	E	Z113 S40	B	112	2	suck	10	180	-100	100
4	Z122 W31	E	Z123 S40	B	122	2	suck	10	180	-100	100
5	Z114 W51	E	Z115 S60	B	114	4	suck	10	870	-100	100
6	Z124 W51	E	Z125 S60	B	124	4	suck	10	870	-100	100
7	Z152 W31	E	Z153 S40	B	152	2	suck	10	870	-100	100
8	Z162 W31	E	Z163 S40	B	162	2	suck	10	870	-100	100
9	Z171 S12	B	Z155 S60	B	154	4	suck	10	570	-100	100
10	Z164 S12	B	Z165 S60	B	164	4	suck	10	570	-100	100
11	Z172 W31	E	Z171 S19	B	172	2	suck	10	570	-100	100
12	Z182 W31	E	Z181 S19	B	182	2	suck	10	570	-100	100
13	Z128 W95	E	Z128 W92	E	128	8	suck	10	1240	-100	100
14	Z128 W92	E	Z128 W95	E	128	8	blow	10	1240	-100	100
15	Z116 W75	E	Z116 W72	E	116	6	suck	10	1580	-100	100
16	Z116 W72	E	Z116 W75	E	116	6	blow	10	1580	-100	100
17	Z146 W75	E	Z146 W72	E	146	6	suck	10	1080	-100	100
18	Z146 W72	E	Z146 W75	E	146	6	blow	10	1080	-100	100
19	Z136 W75	E	Z136 W72	E	136	6	suck	10	950	-100	100
20	Z136 W72	E	Z136 W75	E	136	6	blow	10	950	-100	100
21	Z117 W85	E	Z117 W82	E	117	7	suck	10	830	-100	100
22	Z117 W82	E	Z117 W85	E	117	7	blow	10	830	-100	100
23	Z126 W75	E	Z126 W72	E	126	6	suck	10	700	-100	100
24	Z126 W72	E	Z126 W75	E	126	6	blow	10	700	-100	100
25	Z156 W75	E	Z156 W72	E	156	6	suck	10	500	-100	100
26	Z156 W72	E	Z156 W75	E	156	6	blow	10	500	-100	100
27	Z186 W75	E	Z186 W72	E	186	6	suck	10	570	-100	100
28	Z186 W72	E	Z186 W75	E	186	6	blow	10	570	-100	100
29	Z176 W75	E	Z176 W72	E	176	6	suck	10	570	-100	100
30	Z176 W72	E	Z176 W75	E	176	6	blow	10	570	-100	100
31	Z178 W95	E	Z178 W92	E	178	8	suck	10	890	-100	100

Tube Condition:

RaceTrack	AvTime	Reference Time	%			Reset Time Maintenance	Count Total	Count s. Reset	Speed [m/s]	
25	23,41	23,26	0,66	Trend	Stuck Carrier	---	452	452	21,36	Reset Ma...
26	22,19	21,96	1,02	Trend	Stuck Carrier	---	216	216	22,53	Reset Ma...

Table for tube maintenance

Your benefits when using the Predictive Maintenance App:

- Enables demand-oriented planning of service and maintenance actions
- Undesirable pneumatic tube system conditions can be eliminated immediately by fast reactions to avert cost-intensive consequential damage
- Less spontaneous errors in the system
- The system does not have to be taken down spontaneously
- Higher system reliability and availability

Who we recommend the app:

- Where system reliability is crucial, e.g. when sending samples from emergency surgeries or when a whole production relies on production samples that are sent via pneumatic tube systems
- Modern organizations that attach importance to predictive maintenance and smart building management

P.S.

Using the Predictive Maintenance App is very easy, as in the most cases no additional sensors have to be installed. The app uses the sensors, that are already installed in every one of our pneumatic tube systems.