

Air springs

APPLICATION

Air spring – sorter rebuilding

Customer:	Eurovia Czech Republic
Quarry:	Svrčovec
Sorter:	Metso TS 202 – „banana“
Input fraction:	0 / 8 mm
Number of screening deck:	3
Feed capacity:	100 t / hr
Date of rebuilding:	December 2019

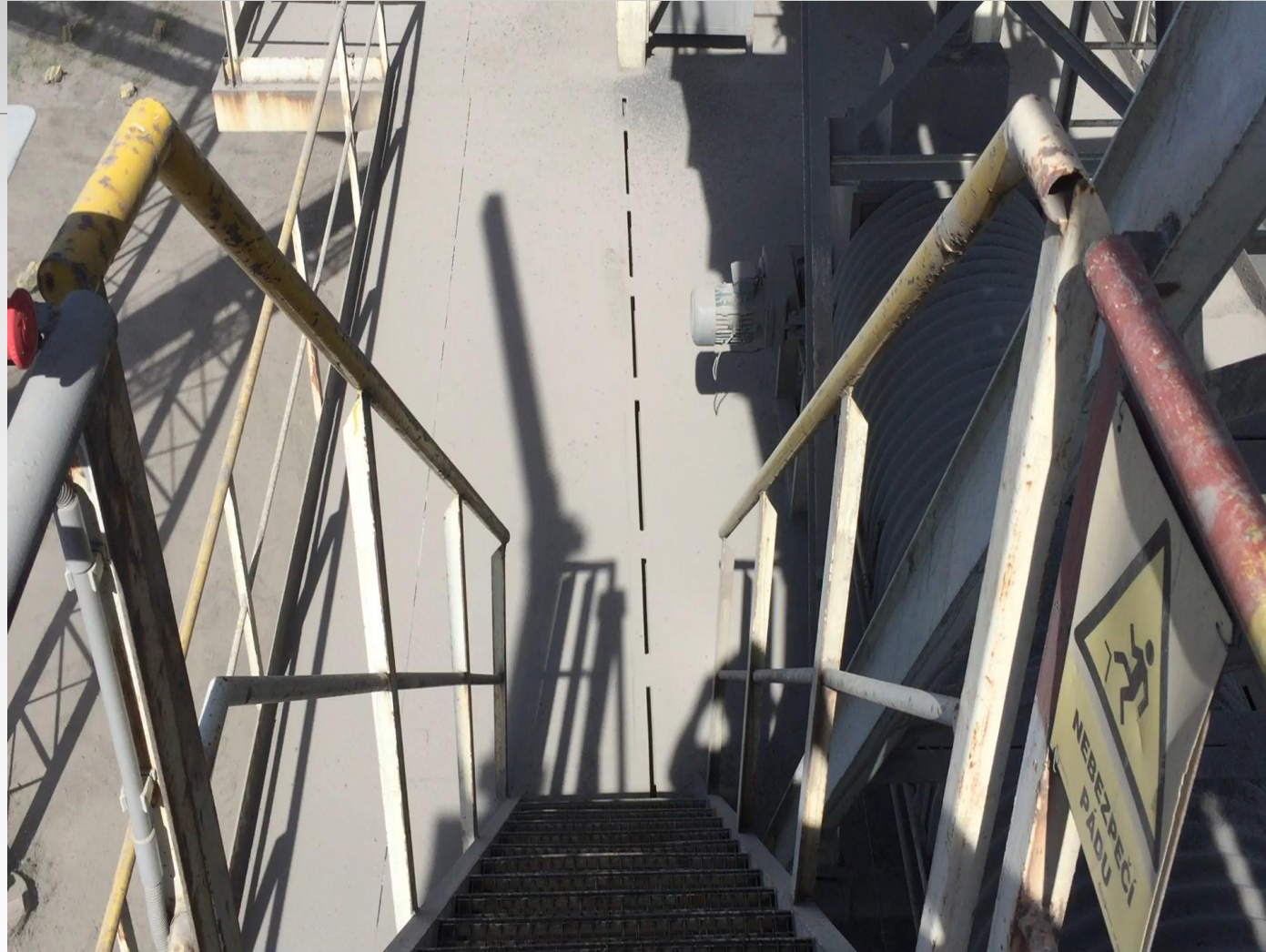
Customer's problems

Excessive vibration of the structure

Material movement to the right side

- Worse results of the sorting process
- Mesh surface wear at the one point

Vibrations stuck on the gallery – before rebuilding



Original rubber springs

Right side of the sorter



Right upper spring



Left bottom spring



Initial state measurement of the construction and sorter

Marking of measuring points

Measurement

Table of measured values – documentation

Sorter and structure report

Measuring points – examples of locations



Input information about the sorter

Form

Dimensional draw

LuCOTEC APPLICATION FORM

Customer: EUROVIA Contact person: Jakub Herman
Plant: Svrcovec Zelt: +420 603 220 020
Address: Czech Republic Mobile: herman@eurositex.cz
E-Mail: herman@eurositex.cz

Application: Dredger screen De-watering Primary screen/Heavy duty screen Grading

Type of feeding: continuous sudden / variable

Machine brand / type: Metsu TS 202 Machine weight: 4800 (kg)
Machine length: 5000 (mm) Machine width: 1500 (mm)
Amplitude: 4,5 (mm) Oscillating machine weight: _____ (kgs)
Motor: 15 (kW) Machine speed: _____ (r.p.m.)
Amperage at start-up: _____ (ampere) Amperage at continuous duty: _____ (ampere)
Spray unit existing?: Yes No open Ø in side wall: _____ (mm)
Ø of spray unit pipes: _____ (mm)

Information regarding spring suspension

Supporting tube Ø _____ (mm) Spring bracket upper spring carrier

Quantity of displacements: _____ Machine frame: _____

Current spring system: RUBBER Spring height: _____ (mm)
(incl. compressed spring rubber height) (incl. spring height)

Control unit / compressed air

Compressed air available: Yes with _____ (bar) No

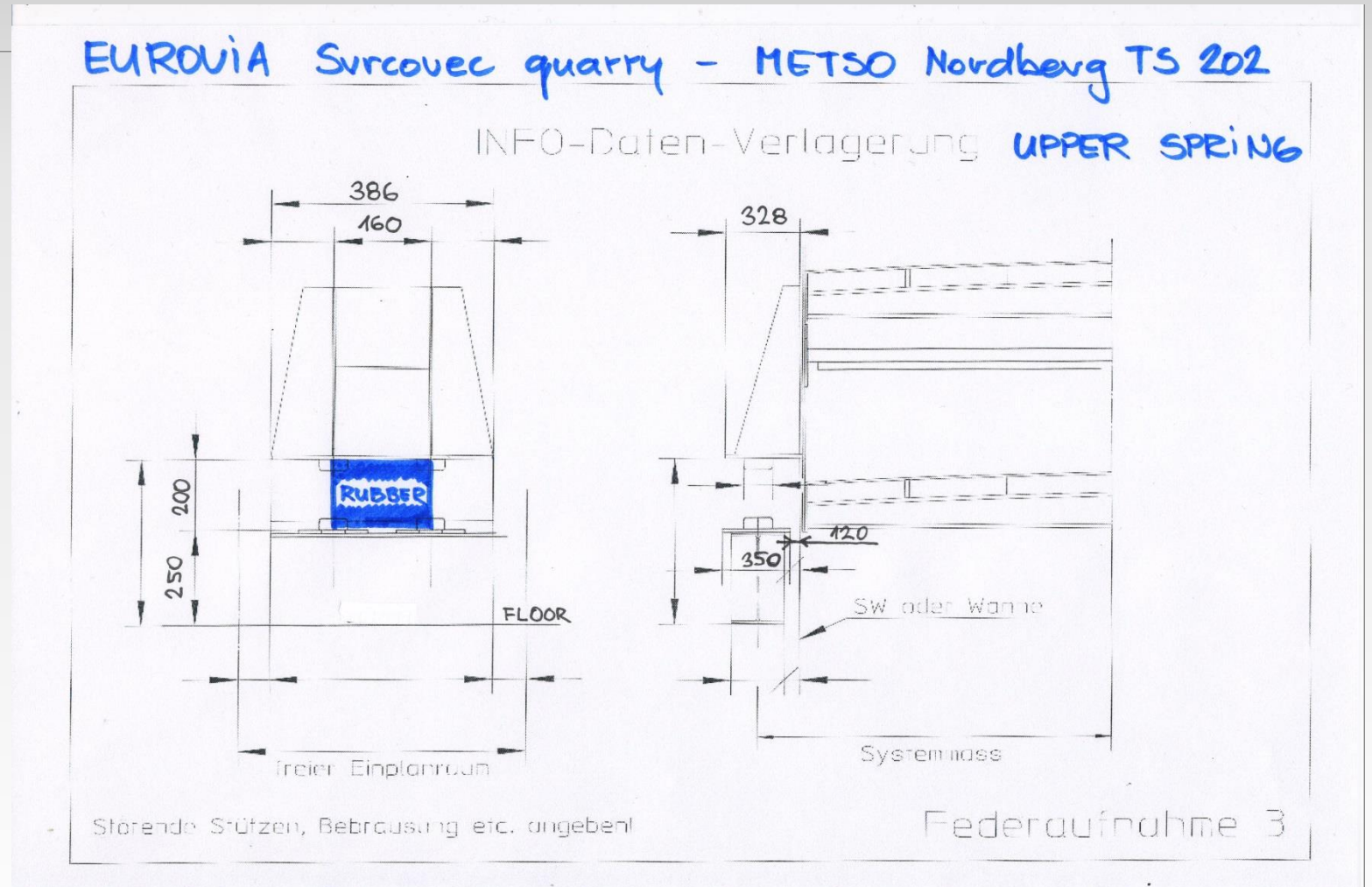
incl. assembly Yes No
incl. start-up Yes No
incl. installation of air supply system Yes No

measuring at site desired Yes No Suggested date: _____

Desired delivery time: _____

Place of installation: Svrcovec, Czech Republic
Date: 27.11.2018 Recorded by: Jakub Herman

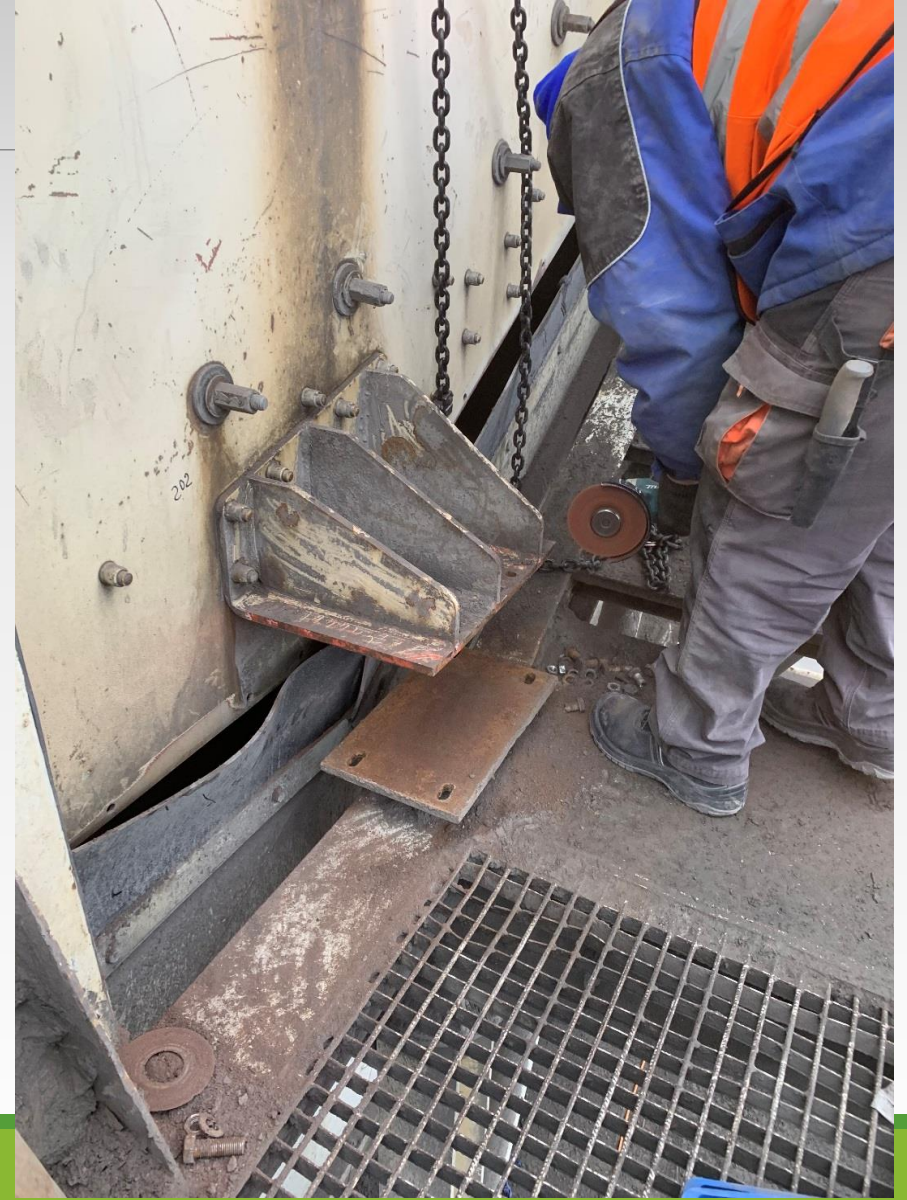
⊕ ATTACHMENT - drawings ; photos



Montage of the Air springs



1. Fixation of the sorter + removal of the rubber springs



2. Preparing the console for Air springs



3. Air springs montage



4. Instalation of air tubes



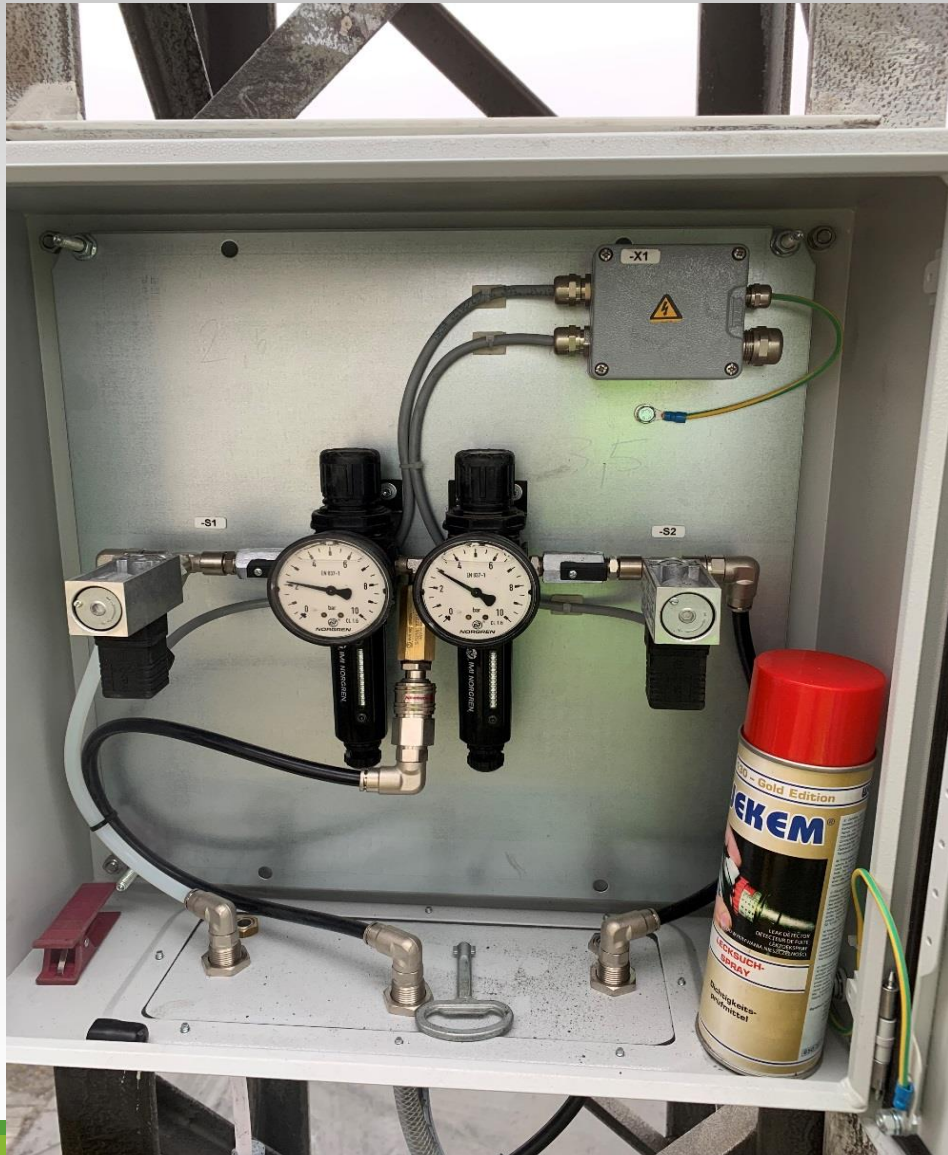
5. Air springs connection



6. Air springs fastening and tubing protection



7. Air springs control box – pressure setting



Anleitung für Luftdruck Einstellung

1. Erhöhung des Vorgabedrucks:
 - a. Kugelhahn schließen ①.
 - b. Druck-Einstellknopf ② entriegeln (hochziehen).
 - c. Zur Druckerhöhung Druck-Einstellknopf ② im Uhrzeigersinn „+“, drehen, bis der gewünschte Betriebsdruck am Manometer ③ angezeigt wird. Nicht mehr zurückdrehen!
 - d. Druck-Einstellknopf ② verriegeln (niederdrücken).
 - e. Kugelhahn öffnen ①.

2,6 při zpetném chodu

Druck / Pressure:
2,6 bar
2,6 psi

Luftzufuhr Achse /
Air supply axis /:

VYSTUP

2. Reduzierung des Vorgabedrucks:
 - a. Kugelhahn schließen ①.
 - b. Druck-Einstellknopf ② entriegeln (hochziehen).
 - c. Zur Druckreduzierung Druck-Einstellknopf ② im Gegenuhrzeigersinn „-“, drehen, bis am Manometer ③ ca. 0,5 bar weniger als der gewünschte Betriebsdruck angezeigt wird.
 - d. Gewünschter Betriebsdruck durch Drehen des Druck-Einstellknopfes ② im Uhrzeigersinn einstellen. Nicht mehr zurückdrehen!
 - e. Druck-Einstellknopf ② verriegeln (niederdrücken).
 - f. Kugelhahn öffnen ①.

BILA'

2 bar



Druck / Pressure:
3,6 bar
3,6 psi

Luftzufuhr Achse /
Air supply axis /:

VYSTUP

Instructions for air pressure adjustment

1. Increase of the operation pressure:
 - a. Close ball valves ①.
 - b. Unlock (pull up) pressure adjustment knob ②.
 - c. To increase the pressure, turn the pressure adjusting knob ② clockwise "+" until the desired operating pressure is indicated on the pressure gauge ③. **Do not turn back!**
 - d. Push down (depress) pressure adjustment knob ②.
 - e. Open ball valves ①.

2. Reduction of the operating pressure
 - a. Close ball valves ①.
 - b. Unlock (pull up) pressure adjustment knob ②.
 - c. To reduce the pressure, turn the pressure adjusting knob ② counterclockwise "-" until the pressure gauge ③ shows approx. 0.5 bar less than the desired operating pressure.
 - d. Set the desired operating pressure by turning the pressure adjustment knob ② clockwise "+". **Do not turn back!**
 - e. Push down (depress) pressure adjustment knob ②.
 - f. Open ball valves ①.

Beachte: Bei einem zu niedrigen Speisedruck (Kompressor Leistung) kann es bis zu 15min dauern, bis vom Druckminderer Systemdruck auf Vorgabedruck eingestellt wird.

Note: If the feed pressure (compressor output) is too low, it may take up to 15 minutes for the pressure reducer to set the system pressure to the default pressure.

8. Trial operation



Results of Air spring rebuilding



Measurement of vibration on the structure

Measuring points	BEFORE (mm/s) - axis			AFTER (mm/s) - axis			Resulting vibration - %		
	Hor	Ver	Tra	Hor	Ver	Tra	Hor	Ver	Tra
Stuck on the stairs to the line	8,8	3,9	67,1	2,7	1,6	28,7	31	41	43
Sorter support – front left	4	16,6	4,5	2,1	4,9	2,3	53	30	51
Sorter support – front right	2,8	13,3	4,3	1,1	4	1,7	39	30	40
Sorter support – back left	2,5	10,6	7,1	2	2,6	3,7	80	25	52
Sorter support – back right	2,4	9,6	6	2,1	3,1	2,6	88	32	43
Gallery support	35,4	47,3	68,4	9,9	13,7	11,5	28	29	17
Gallery stuck - down	9,2	23,7	207,1	9	5,9	49,7	98	25	24
Gallery stuck - up	33,3	30,4	46,2	8,9	10,4	56,9	27	34	123
Conveyor support	34,7	25,7	19,4	7,5	2,5	6,7	22	10	35
Average vibration reduction							52	28	47
Direction of oscillation: Hor = Horizontal Ver = Vertical Tra = Transversal									

Measurement of vibration on the sorter

Measuring points	BEFORE (mm/s) - axis			AFTER (mm/s) - axis			Resulting vibration - %		
	Hor	Ver	Tra	Hor	Ver	Tra	Hor	Ver	Tra
Spring support – front left	6,1	10,6	11,2	4,7	6,3	7,1	77	59	63
Spring support – front right	9,2	5,1	10,2	7,3	5	4,4	79	98	43
Spring support – back left	5,7	10,5	7,8	5,6	2,6	8,6	98	25	110
Spring support – back right	3,9	7,5	8,1	5,4	3,4	4,7	138	45	58
Average vibration reduction							98	57	69
Direction of oscillation: Hor = horizontal Ver = Vertical Tra = Transversal									

Oscillation parameters – sorter input

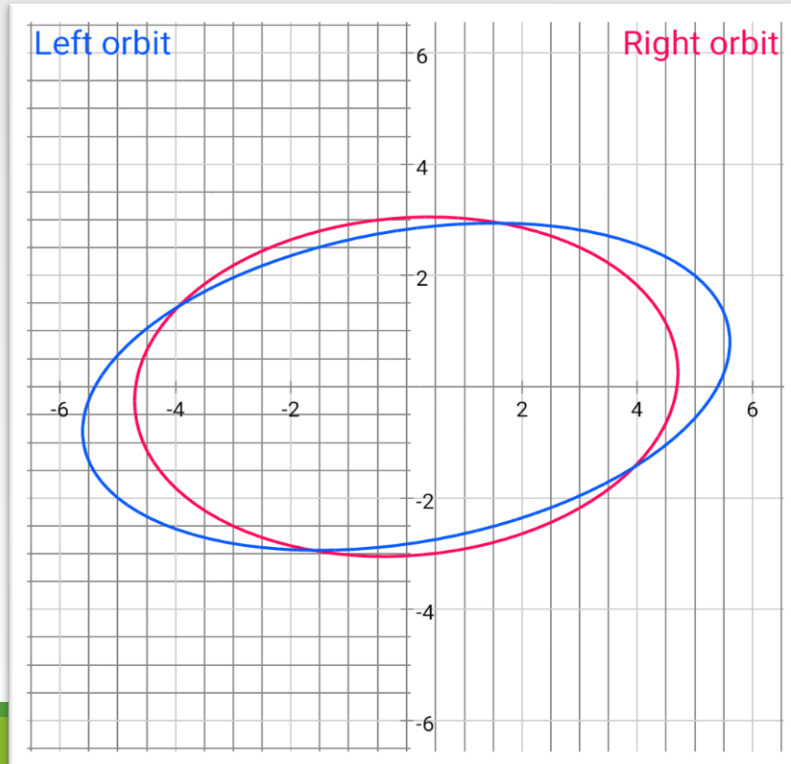
BEFORE

Amplitude right side 9,44 mm

Amplitude left side 11,36 mm

Acceleration right side 3,8 g

Acceleration left side 4,6 g



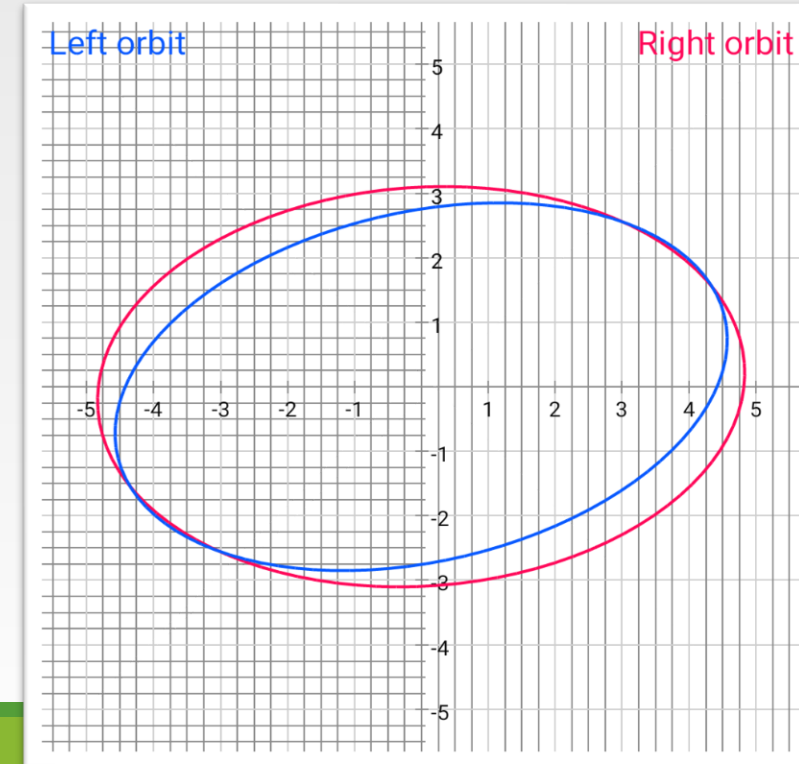
AFTER

Amplitude right side 9,69 mm

Amplitude left side 9,33 mm

Acceleration right side 3,9 g

Acceleration left side 3,9 g



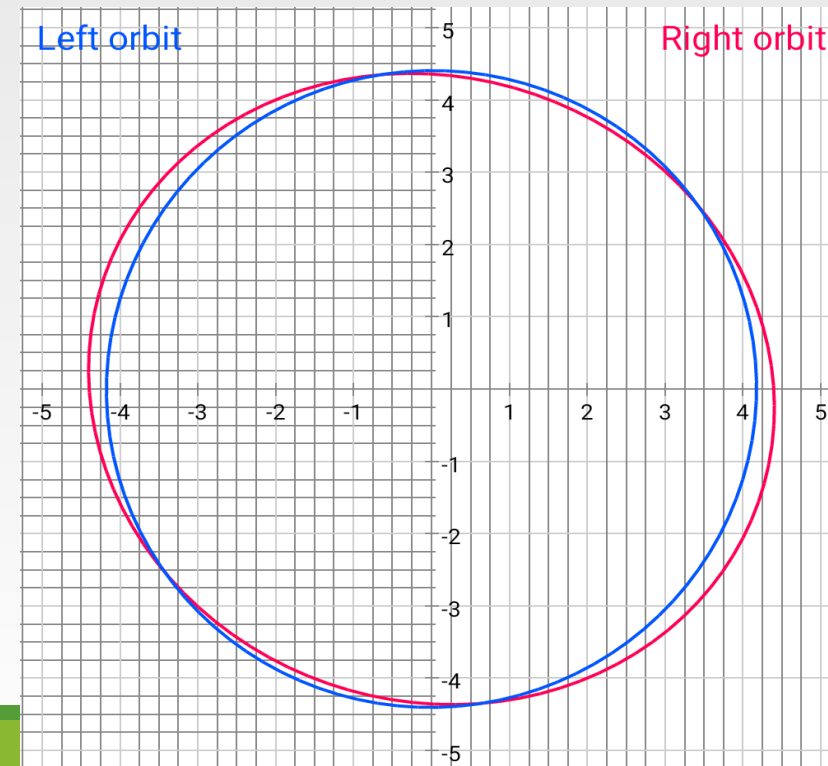
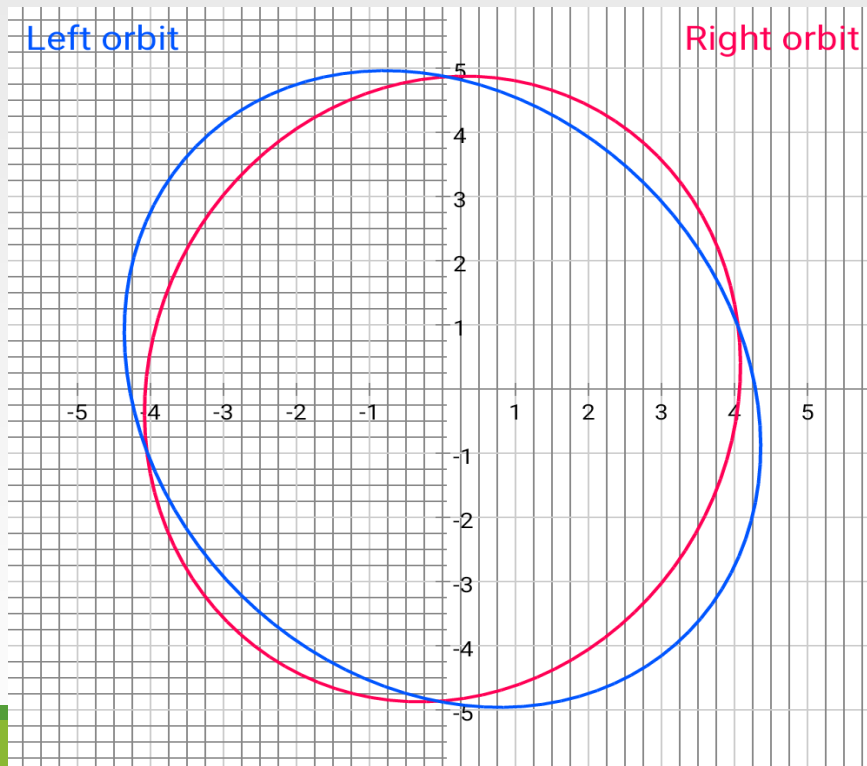
Oscillation parameters – sorter center

BEFORE

Amplitude right side	9,81 mm
Amplitude left side	10,32 mm
Acceleration right side	4,0 g
Acceleration left side	4,2 g

AFTER

Amplitude right side	9,03 mm
Amplitude left side	8,81 mm
Acceleration right side	3,7 g
Acceleration left side	3,6 g



Oscillation parameters – sorter exit

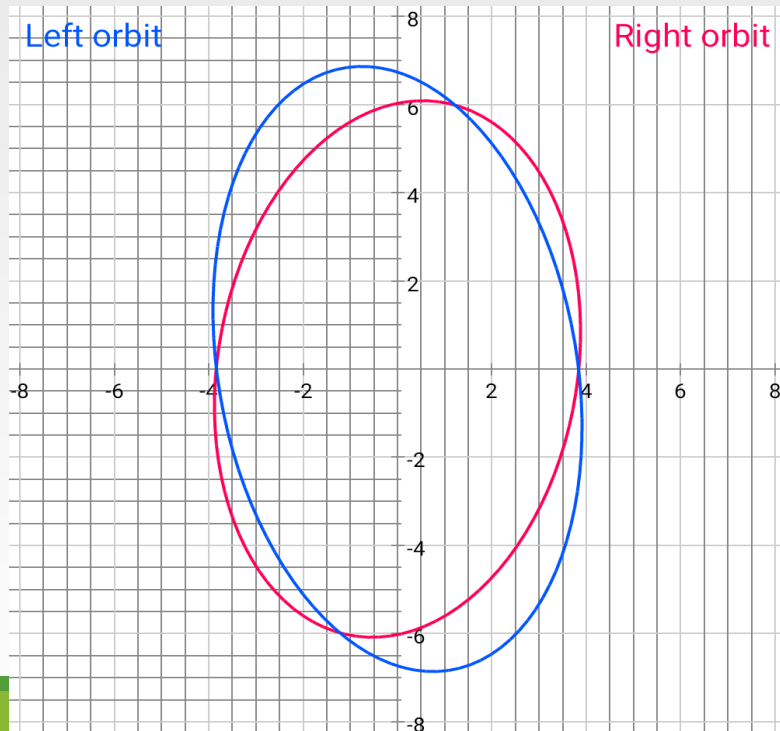
BEFORE

Amplitude right side 12,25 mm

Amplitude left side 13,84 mm

Acceleration right side 5,0 g

Acceleration left side 5,6 g



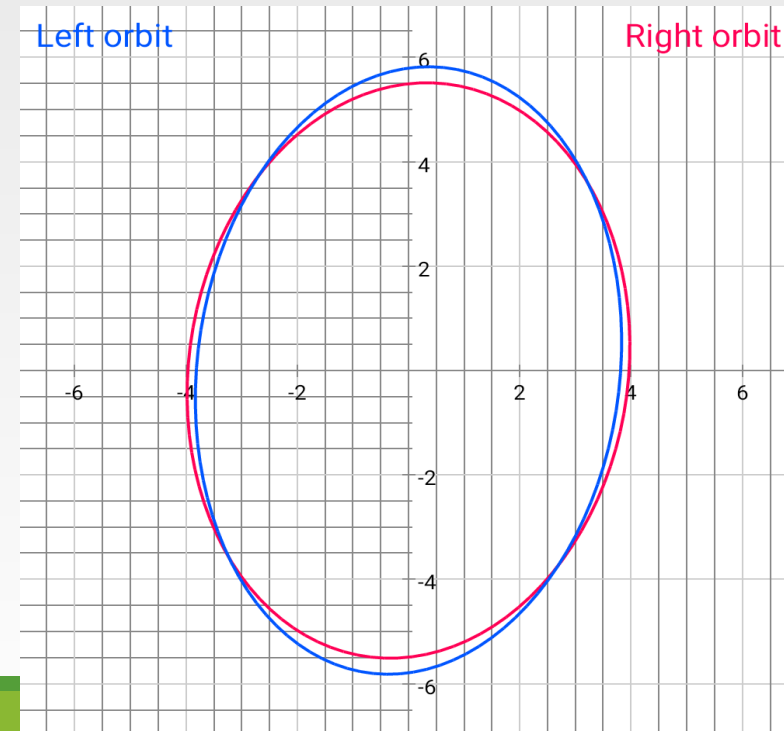
AFTER

Amplitude right side 11,06 mm

Amplitude left side 11,68 mm

Acceleration right side 4,5 g

Acceleration left side 4,7 g



Deflection of sorter's sidewalls

Left sidewall

		before	after
input	up	0,6	0,09
	down	0,57	0,52
center	up	2,19	0,13
	down	1,5	0,51
exit	up	6,38	0,47
	down	5,61	0,99

Right sidewall

		before	after
input	up	0,82	0,12
	down	0,6	0,58
center	up	2,11	0,15
	down	1,27	0,23
exit	up	6,46	0,58
	down	5,79	0,91

Thank you for your attention!

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