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APM accumulating conveyor

with free wheel coupler for pallets

March 2015

Accumulating conveyors have a friction coupling

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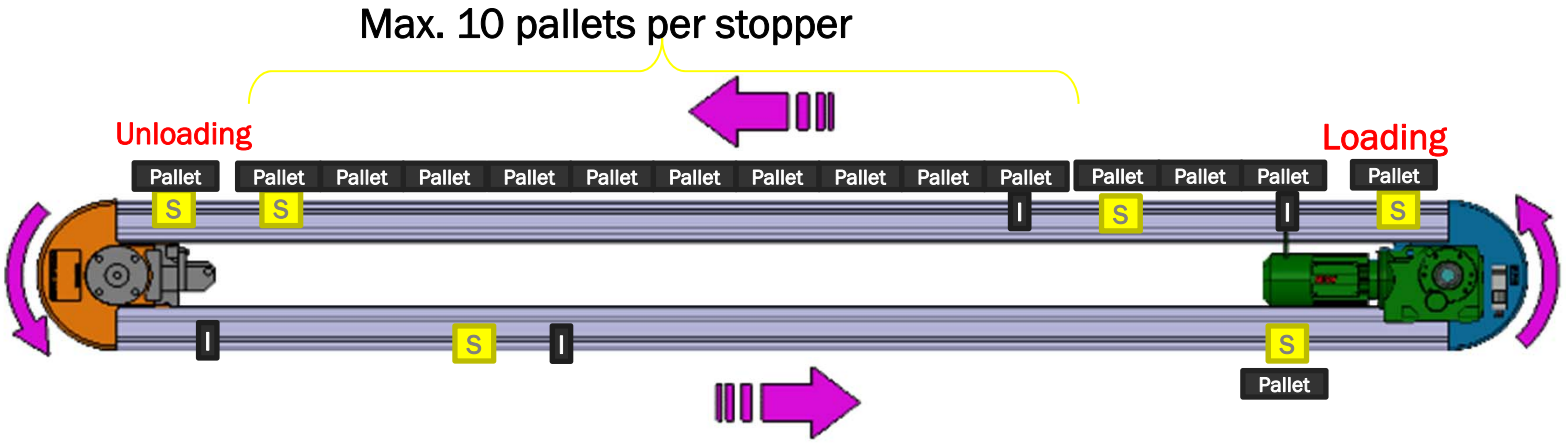
In order to stop the pallets irrespective of the chain drive, these are not directly coupled to the drive chain, but through a friction coupling.

Most of the time, the conveyor pallets are standing still,

- consuming energy
- generating wear and tear in the coupling elements

In the proper sense, the accumulating conveyor is an “energy dissipation machine”!



Other disadvantages of the friction coupling

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- The motor power must always be adjusted to the total of the friction forces = friction coupling (each 40-50 N) and the pallet weight to be lifted.
- In front of the stop/isolation points, the friction forces add up to an accumulating pressure that may impede the mechanism of isolation so that safe opening is not always ensured.
- For this reason, the maximum number of pallets to be accumulated in front of a stop point is limited to 10 units.
- With a high number of pallets, additional stop points must be arranged for even though three units would be sufficient for the function.

New concept “Free wheel coupler for conveyor pallet“

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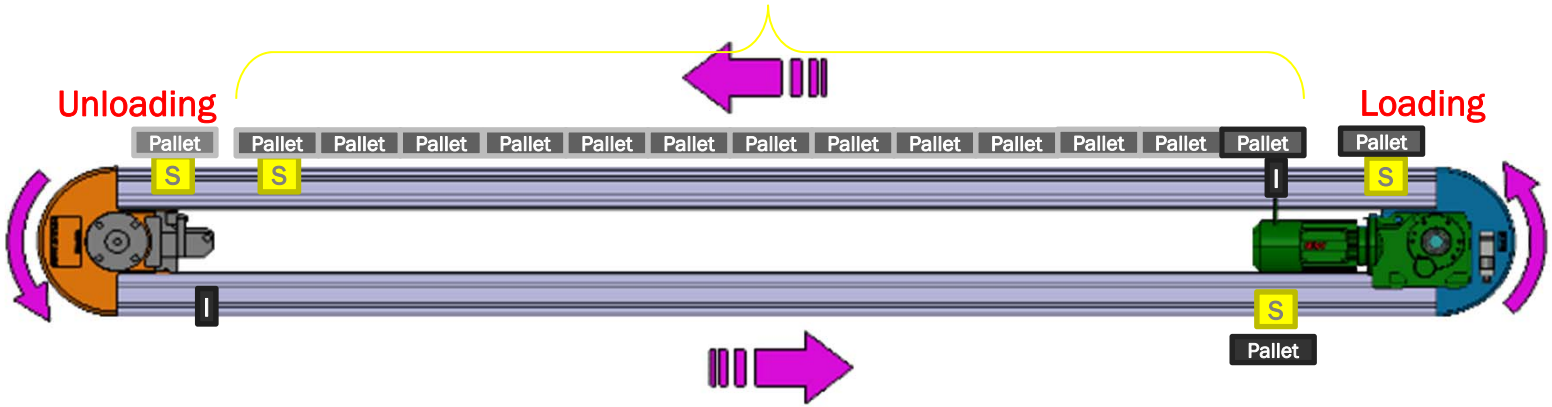
- Similar to a vehicle, the friction is coupled during conveying.
- When accumulating in front of a stop point or a standing pallet train, the friction is uncoupled
- The connection between the toothwheel and the friction is open. The wheel turns freely in the chain.

WITHOUT MAXIMUM number of pallets per stopper



Functional principle of free wheel operation

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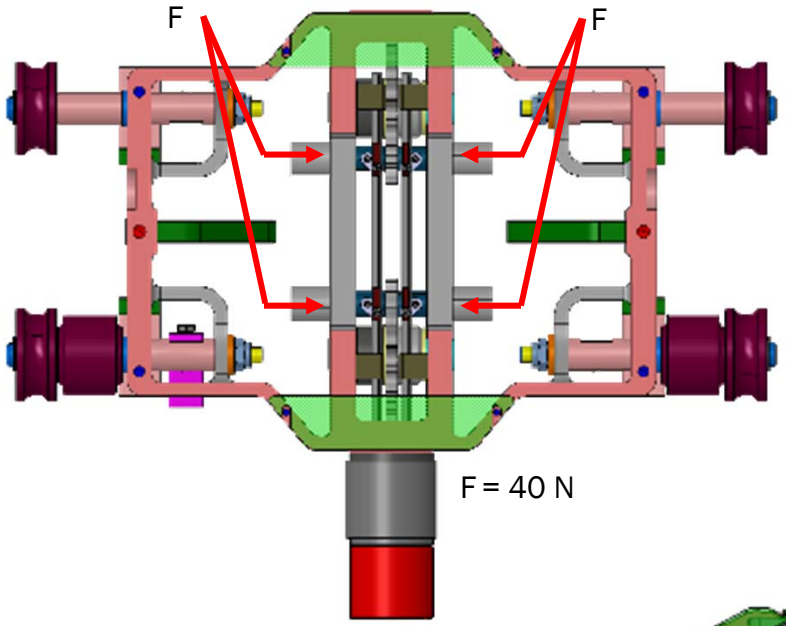
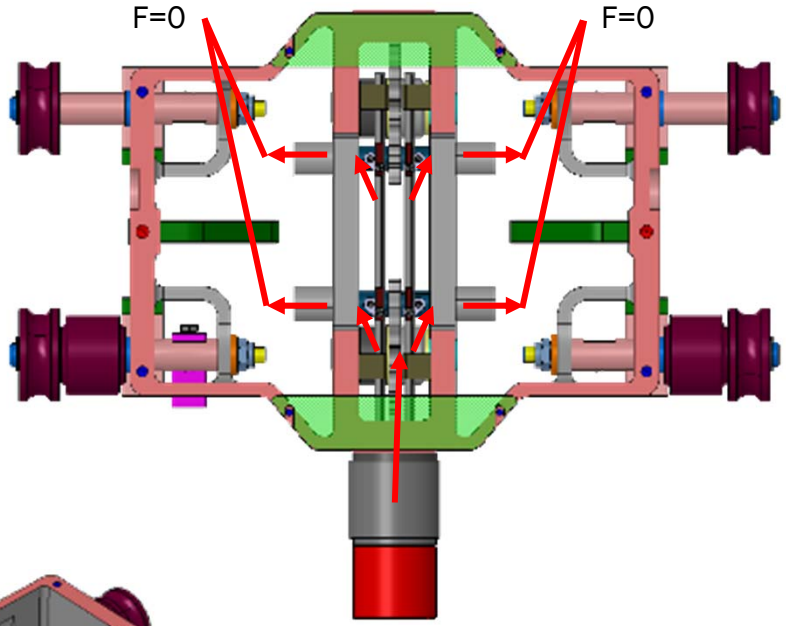
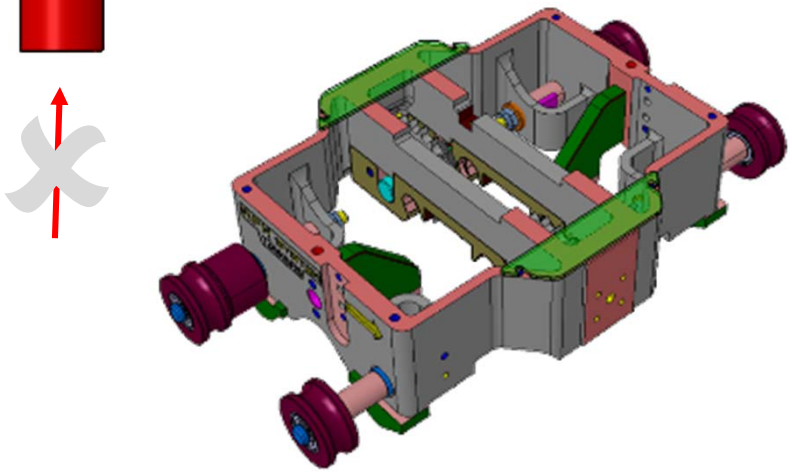
Friction operation



Uncoupled operation





System in test operation

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= Uncoupling when pallets accumulate in front of the stop point

Complete system in operation

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Operating button for uncoupling upon accumulation

Energy consumption compared

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Power consumption in static	Standard pallet/Standard system	Uncoupled friction/DS System	Difference	Percentage
Static pallet rubbing + chain movement	0,47 kW	0,28 kW	- 0,19 kW	- 40,65 %
	Standard pallet/Standard system	Uncoupled friction/DS System	Difference	Percentage
	25 pallets	25 pallets	-	-
	8 stopper	4 stopper	- 4 stopper	-
Power consumption (0,13 kWh/m³)	kWh	kWh	kWh	%
per cycle	0,008	0,005	-0,003	-36,94%
per day (1000 cycles + 7,3 h static)	11,071	6,859	-4,215	-38,07%
per year (360 days)	3985,676	2468,176	-1517,500	- 38,07%
over project time (8 yrs)	31885,408	19745,408	- 12140,000	- 38,07%
CO2 Emission (600 g /kWh)	kg	kg	kg	%
per cycle	0,005	0,003	- 0,002	-36,94%
per day (1000 cycles + 7,3 h static)	6,643	4,114	- 2,529	-38,07%
per year (360 days)	2391,406	1480,906	- 910,500	- 38,07%
over project time (8 yrs)	19131,245	11847,245	- 7284,000	- 38,07%
Operation costs (1,43 ct/m³ - 11ct/kWh)	€	€	€	%
per cycle	0,001	0,001	0,000	-36,94%
per day (1000 cycles + 7,3 h static)	1,218	0,754	- 0,464	-38,07%
per year (360 days)	4,3842	271,50	- 166,925	- 38,07%
Over project time (8 yrs)	**3507,39**	**2171,99**	**-1335,400**	- 38,07%
	Standard pallet/Standard system	Uncoupled friction/DS System	Difference	Percentage
	25 pallets	25 pallets	-	-
	8 stopper	4 stopper	- 4 stopper	-
Initial costs	€	€	€	%
Stopper (1000,00€)	8000,00	4000,00	- 4000,00	- 50,00%
Standard Pallet (400,00€) / clutch pallet system (530,00€)	10000,00	13250,00	3250,00	24,53%
TOTAL	**18000,00**	**17250,00**	**- 750,00**	**- 4,35%**
	Standard pallet/Standard system	Uncoupled friction/DS System	Difference	Percentage
Summary costs over project time (8 yrs)	€	€	€	%
Energetic costs 8 years	3507,39	2171,99	- 1335,40	- 38,07%
Initial costs	18000,00	17250,00	- 750,00	- 4,35%
Summary costs over project time (8 yrs)	€	€	€	%
Over project time	**21507,39**	**19421,99**	**- 2085,40**	**- 9,70%**

Advantages of free wheel system at a glance

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- Accumulating conveyor and pallet geometry compatible with former APM series

- Energy efficiency
  = lower motor power to be installed
  = lower power consumption in operation

- Smaller number of stops / gear racks required

  - Reduced number of mechanical components
  - Less control required (valves, SPS)

- Maintenance-free as no wear and tear of friction couplings

Contact

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