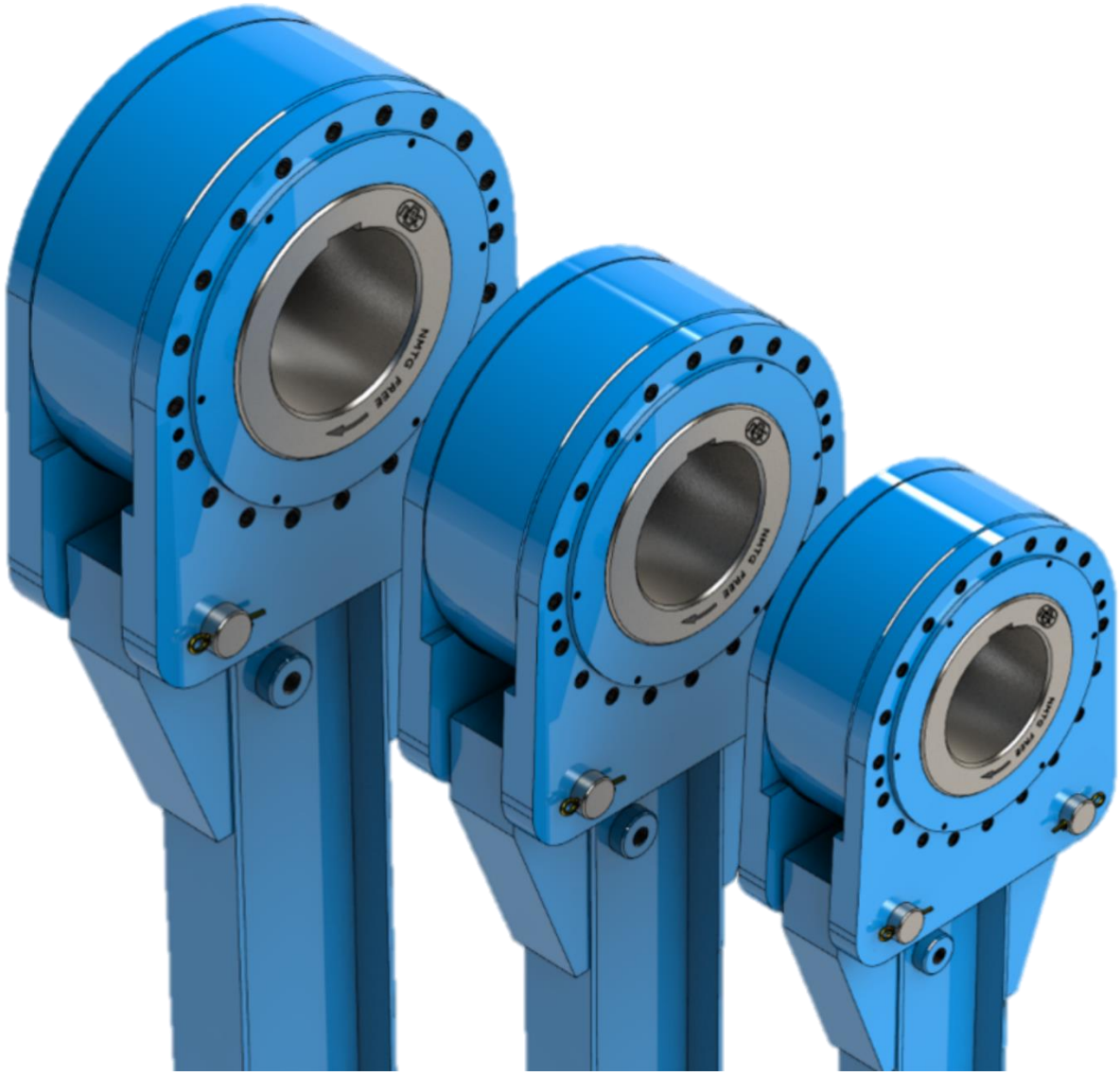
NMTG Mechtrans Techniques Pvt. Ltd.



External Holdback (Backstop) Selection Procedure for Inclined Belt Conveyor

NMTG MODEL: NRHD (Sprag Type) & NRSC (Roller Type)

DOC NO: N-DD-EHSP-230721 **Issue Date: 23-07-'21**

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Preventing reverse rotation of inclined or vertical conveyor systems is one of the most common applications for Backstops. This annexure presents the most common types examples needed to properly size BACKSTOP in order to maximize performance and improve safety of the conveying system.

❖ **Step: 1 - Calculate the torque of the Clutch.**

1. **<u>Single Drive:</u>**
   - Backstop for low speed application are directly mounted on extended Head or Drive pulley shaft opposite to the Drive as shown in fig.1

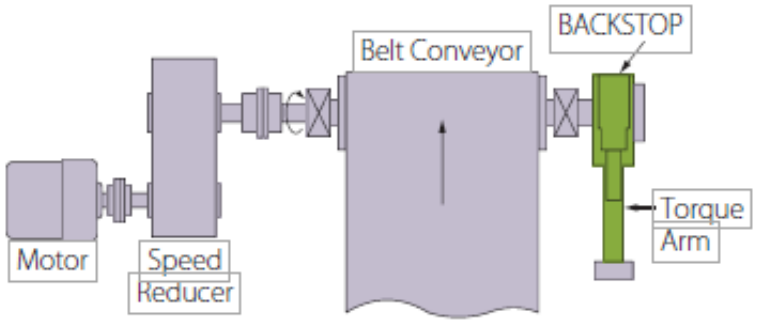

Figure 1

   - Torque(Nm) (T_{sys}) = $\frac{Motor\ Power\ (kW)\ x\ 9550}{Speed\ of\ Shaft}$

❖ **Step: 2 - Determine the service factor (Refer the table)**

Calculated Whole system Torque = Torque (Nm) (T_{sys}) x SF

2. **<u>Dual Drives with Single Backstop:</u>**
   - Dual Drives, Single Backstop arrangements for low speed application are directly mounted on extended Head or Drive pulley shaft opposite to the Drive as shown in fig.2

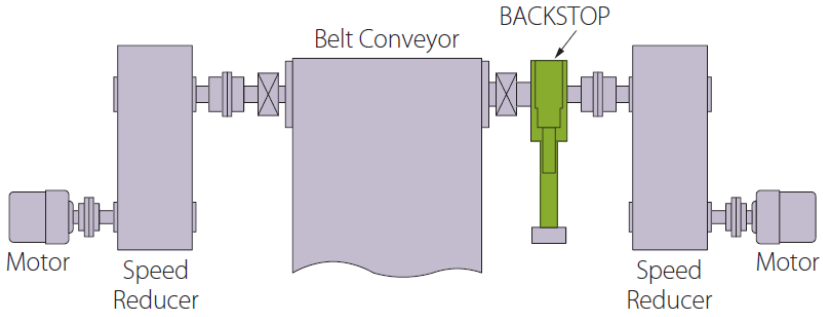

Figure 2

   - Select Backstop to hold the entire system torque.
   - Torque(Nm) (T_{sys}) = $\frac{2\ x\ Motor\ Power\ (kW)\ x\ 9550}{Speed\ of\ Shaft}$

❖ **Step: 2 - Determine the service factor (Refer the table).**

   - Calculated Whole system Torque = Torque(Nm) (T_{sys}) x SF

3. Tandem Drives:

- In this type of Application, There will be two drives Primary & Secondary as shown in fig.3

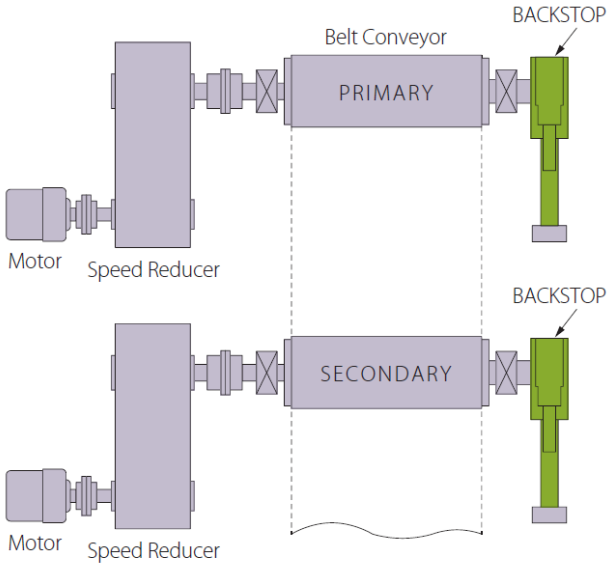

Figure 3

- The backstop(s) on the primary pulley shaft must be sized to have a torque capacity equal to the total of the primary and secondary drive motors.
- **Primary Drive Torque(Nm) (T_{sys1})** = $\frac{(Primary\ Drive\ Power\ (kW) + Secondary\ Drive\ Power\ (kW))\ x\ 9550}{Speed\ of\ Shaft}$
- The BACKSTOP for secondary drive should be sized from secondary drive motor only
- **Secondary Drive Torque(Nm) (T_{sys2})** = $\frac{Secondary\ Drive\ Power\ (kW)\ x\ 9550}{Speed\ of\ Shaft}$

❖ **Step: 2 - Determine the service factor (Refer the table).**

- Calculated system Torque for Primary Drive = Torque(Nm) (T_{sys1}) x SF
- Calculated system Torque for Secondary Drive = Torque(Nm) (T_{sys2}) x SF

4. Dual Drives with Tandem Backstop:

- In this type of Application, Dual Drives with tandem backstop arrangements on single pulley arrangements as shown in fig.4.

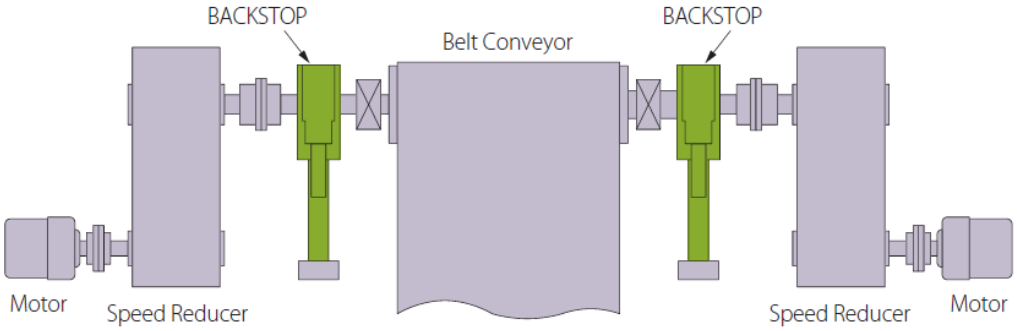

Figure 4

- If two backstops are located on the same shaft, as shown in Fig. 4, they will not initially share the load equally.
- Select each backstop to hold 70 % of total system backstop torque.
- **Torque(Nm) (T_{sys})** = $\frac{Total\ Motor\ Power\ of\ two\ System\ x\ 9550}{Speed\ of\ Shaft}$

❖ **Step: 2 - Determine the service factor (Refer the table)**

- Calculated Whole system Torque = Torque(Nm) (T_{sys}) x 0.7 x SF = Nm per Backstop

❖ **Step : 3 - Bore size and installation method**

❖ **Step: 4 - Determine the max. Overrunning speed and cycle time of operation.**

❖ **Step: 5 - Select nearest equal / higher side torque referring catalogue table torque and specify the name of model & bore size.**

❖ **Service Factor**

Motor Stalled Torque	
Maximum Stalled Torque or Breakdown torque % of Normal Motor Rating	Service Factor
175%	1.17
200%	1.33
250%	1.67
300%	2.00
Fatigue Loading	
Service Condition	Service Factor
For backstopping 3 - 10 times per day Service Factor	1.5
For backstopping over 10 times per day Service Factor	2