Welcome!

Haldex Capital Market Day

9 March 2018
Today’s topics

- **Long-term strategy & vision**
  Åke Bengtsson, CEO

- **Financial targets**
  Andreas Ekberg, acting CFO

- **Product leadership & autonomous driving**
  Andreas Jähnke, SVP R&D

- **Aftermarket expansion**
  Walter Frankiewicz, SVP North American sales

- **Increased demand for brake adjusters in China**
  Åke Bengtsson, CEO

- **From drum brakes to disc brakes in North America**
  Walter Frankiewicz, SVP North American sales
Long term strategy and vision

Åke Bengtsson, CEO

Haldex Capital Market Day
9 March 2018
Haldex in numbers

2017
Sales, SEK Millions

4,462

Listed on Nasdaq Stockholm Exchange (HLDX)

Haldex, founded in 1887, is headquartered in Sweden with presence in 19 countries for sales, development and manufacturing.
Our vision

A world of safer vehicles

From engineer to fleet owner, manufacturer to truck driver, and the millions of people on the world’s roads. To achieve this ambitious vision we need to harness the determination, energy and passion found in every corner of our company.
Innovative products

PRODUCT OVERVIEW

A selection of Haldex product categories on a global basis.

Air disc brakes  Actuators  Brake adjusters  Valves
Air suspension  Air treatment

EBS/ABS  Parking Safety  Diagnostics  Friction & Reman

Air Control  Foundation Brake
Great regional differences

North America

- Drum brakes still dominating the market but the shift to disc brakes has started
- The trend of keeping vehicles over a longer period of time is beneficial for aftermarket sales
- Sales to both OEMs and fleets

Europe

- Disc brakes are dominating
- More technology content per vehicle
- Stricter safety regulations
North America official build rates increased with 11% in 2017. The North American market is expected to increase with 20% in 2018.

Europe official build rates increased with 5% in 2017. The European market is expected to grow with 3% in 2018.

India and Brazil are expected to increase in 2018 while China will decline.

Source: the information pertaining to trucks is based on statistics from JD Powers. Information pertaining to the trailer market in Europe is based on statistics from CLEAR, the information pertaining to trucks and trailers in North America is based on statistics from FTR and the trailer information from South America and Asia is based on local sources.
North America official build rates increased with 2% in 2017. The North American market is expected to decline with 1% in 2018.

European build rates were on par in 2017. The European market is expected to decline with 4% in 2018.

Brazil is expected to grow, India to be flat and China to decline in 2018.

Source: The information pertaining to trucks is based on statistics from JD Powers. Information pertaining to the trailer market in Europe is based on statistics from CLEAR, the information pertaining to trucks and trailers in North America is based on statistics from FTR and the trailer information from South America and Asia is based on local sources.
Business Model

A volume of vehicles with Haldex products is created

A high volume of vehicles drives sales and margins in the aftermarket

Demand from workshops and vehicle owners drives sales by distributors

OEM Assembly

OES Distribution

Independent Aftermarket Distribution

First owners of the vehicle

Later owners of the vehicle
Smarter transportation drives long term value

- Increased transportation needs and improved infrastructure
- Sustainable and safe solutions needed
- Cost efficiency
- Connectivity
- Electrification
- Autonomous driving
Strategic direction

STRAategic OBJECTIVES
- Profitable growth
- Ethical Haldex
- Green Haldex
- Safe Haldex

DRIVING OUR FUTURE 2016 - 2021

PRODUCT LEADERSHIP
- Innovative product development
- Value driving product properties
- R&D capabilities
- Product/technology roadmaps

CUSTOMER FOCUS
- Entrepreneurship
- Customer service
- Key account approach
- Commercial excellence program

AFTERMARKET EXPANSION
- Lifecycle offering approach
- Second brand and reman offerings
- E-commerce
- M&A driven capability growth
- Digitalized offerings

OPERATIONAL EXCELLENCE
- Safety #1
- Quality – 0 defects
- Manage cost
- Standardized work
- Continuous improvement

BRIDGE BUILDING CULTURE
- Ethics
- 5C behaviors
- Leadership
- Competence
2017 – an exceptional year

- **Operating Margin**: 10%
- **Organic Growth**: Faster than the market
- **Net Debt/Equity**: <1
- **Dividend**: 1/3
Questions?
Financial targets

Andreas Ekberg, Acting CFO

Haldex Capital Market Day
9 March 2018
Sales, Haldex Group

<table>
<thead>
<tr>
<th></th>
<th>Q4/17</th>
<th>Q4/16</th>
<th>2017</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net sales, SEK million</td>
<td>1,049</td>
<td>1,054</td>
<td>4,462</td>
<td>4,374</td>
</tr>
<tr>
<td>Growth, currency adjusted</td>
<td>5%</td>
<td>-5%</td>
<td>1%</td>
<td>-9%</td>
</tr>
</tbody>
</table>
# Sales per product line

**Foundation Brake:** Disc brake sales and brake adjuster sales continued to increase. Actuators returned to growth in second half of the year and achieved growth also on a full year basis.

**Air Controls:** ABS was declining. The Reman sales has stabilized after previous year’s decline.

<table>
<thead>
<tr>
<th></th>
<th>Q4/17</th>
<th>Q4/16</th>
<th>change¹</th>
<th>2017</th>
<th>2016</th>
<th>change¹</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Foundation Brake</strong></td>
<td>598</td>
<td>577</td>
<td>9%</td>
<td>2,529</td>
<td>2,420</td>
<td>4%</td>
</tr>
<tr>
<td><strong>Air Controls</strong></td>
<td>451</td>
<td>477</td>
<td>-1%</td>
<td>1,933</td>
<td>1,954</td>
<td>-2%</td>
</tr>
</tbody>
</table>

¹ currency adjusted
Sales per region

**Europe**: Sales of disc brakes, actuators and brake adjusters have increased.

**North America**: Largest increase from sales of brake adjusters and actuators. Disc brake sales is growing, but from low levels.

**Asia**: Sales in both India and China increased. Sales of brake adjusters and ABS have increased while sales of an older version of the disc brake has declined.

**South America**: In Brazil, revenue increased mainly due to growth of sales in the aftermarket.

<table>
<thead>
<tr>
<th>Region</th>
<th>2017</th>
<th>2016</th>
<th>change¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe</td>
<td>1,665</td>
<td>1,571</td>
<td>5%</td>
</tr>
<tr>
<td>North America</td>
<td>2,202</td>
<td>2,238</td>
<td>-2%</td>
</tr>
<tr>
<td>Asia &amp; Middle East</td>
<td>462</td>
<td>445</td>
<td>4%</td>
</tr>
<tr>
<td>South America</td>
<td>133</td>
<td>120</td>
<td>3%</td>
</tr>
</tbody>
</table>

¹ currency adjusted
Sales per customer category

**Truck:** Sales have increased in all geographic regions.

**Trailer:** Continued success for the disc brake in Europe. Trailer sales in North America has decreased while it has increased in Asia.

**Aftermarket:** Sales growth in all geographic regions.

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<th>Q4/16</th>
<th>change¹</th>
<th>2017</th>
<th>2016</th>
<th>change¹</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Truck</strong></td>
<td>264</td>
<td>236</td>
<td>19%</td>
<td>1,029</td>
<td>1,006</td>
<td>2%</td>
</tr>
<tr>
<td><strong>Trailer</strong></td>
<td>309</td>
<td>334</td>
<td>-4%</td>
<td>1,400</td>
<td>1,383</td>
<td>1%</td>
</tr>
<tr>
<td><strong>Aftermarket</strong></td>
<td>476</td>
<td>484</td>
<td>4%</td>
<td>2,033</td>
<td>1,985</td>
<td>2%</td>
</tr>
</tbody>
</table>

¹ currency adjusted
Earnings

Operating income & margin*

Sales & Margins*

Earnings per share

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>2016</th>
<th>change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross margin, %</td>
<td>27.5</td>
<td>27.9</td>
<td>-0.4</td>
</tr>
<tr>
<td>Operating income (excl one-off items), SEK million</td>
<td>292</td>
<td>291</td>
<td>0%</td>
</tr>
<tr>
<td>Operating income, SEK million</td>
<td>149</td>
<td>204</td>
<td>-27%</td>
</tr>
<tr>
<td>Operating margin (excl. one-off items), %</td>
<td>6.5</td>
<td>6.6</td>
<td>-0.1</td>
</tr>
<tr>
<td>Operating margin, %</td>
<td>3.3</td>
<td>4.7</td>
<td>-1.4</td>
</tr>
<tr>
<td>Net income, SEK million</td>
<td>79</td>
<td>91</td>
<td>-13%</td>
</tr>
<tr>
<td>Earnings per share, SEK</td>
<td>1.67</td>
<td>2.00</td>
<td>-16%</td>
</tr>
</tbody>
</table>

143 MSEK in one-offs in 2017, of which SEK 19 m related to restructuring activities, SEK 56 m to customer commitments and SEK 68 m related to the bidding process.
Cash Flow

Working Capital & Cash Conversion Days

Cash flow
operating activities

Working capital &
Cash conversion days

<table>
<thead>
<tr>
<th></th>
<th>Q4/17</th>
<th>Q3/17</th>
<th>Q2/17</th>
<th>Q1/17</th>
<th>Q4/16</th>
<th>Q3/16</th>
<th>Q2/16</th>
<th>Q1/16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash flow from operating activities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SEK million</td>
<td>45</td>
<td>27</td>
<td>39</td>
<td>19</td>
<td>88</td>
<td>65</td>
<td>61</td>
<td>42</td>
</tr>
<tr>
<td>Cash flow after net investments*</td>
<td>16</td>
<td>1</td>
<td>13</td>
<td>4</td>
<td>92</td>
<td>27</td>
<td>25</td>
<td>21</td>
</tr>
</tbody>
</table>

* excluding one-off items
Innovative Vehicle Solutions

**Investments & Depreciation**

- After the financial crisis investments were on a low level
- Haldex will continue to increase its investments in Capacity as well as R&D following the technology shift
Revenue & volume shift
North America

- With increased Disc Brake penetration, Haldex can increase the total delivered value within Foundation Brake

About 5 times higher compared to current drum brake ABA offering
Gross margin shift – North America

- Margin% for ADB will be lower compared to ABA the initial years as ADB will have less Aftermarket
- But the overall Gross margin grows from the higher delivered value per wheel end

Pictural Gross Margin shift ABA => ADB in North America

- Gross Margin Shift
- ABA Gross Margin
- ADB Gross Margin

Time

Y1 Y2 Y3 Y4 Y5 Y6 Y7 Y8
- Haldex has in the past two years increased its R&D effort and will continue to spend more in the next few years to develop new technology

- Another important focus area is to further strengthen the organization for Supplier Quality Assurance

- As no major re-structuring projects are currently planned, one-time cost are estimated to be significantly lower in 2018 compared to the previous two years
## Financing

<table>
<thead>
<tr>
<th>Financing Source</th>
<th>Amount</th>
<th>Maturing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bond Loan</td>
<td>SEK 270 m</td>
<td>2020</td>
</tr>
<tr>
<td>Syndicated Credit Facility</td>
<td>EUR 90 m</td>
<td>2021</td>
</tr>
</tbody>
</table>

As per December 31\textsuperscript{st} 2017, the syndicated facility was undrawn
Haldex in 2018

We estimate net sales for 2018 to increase compared to 2017.

Higher sales enable higher operating income. This will be offset against greater investment in development projects and costs for expansion in North America and China.

The operating margin for 2018 is expected to be slightly lower or in line with the operating margin excluding one-off items in 2017.
Questions?
Strategic direction

STRATEGIC OBJECTIVES
- Profitable growth
- Ethical Haldex
- Green Haldex
- Safe Haldex

DRIVING OUR FUTURE 2016 - 2021

PRODUCT LEADERSHIP
- Innovative product development
- Value driving product properties
- R&D capabilities
- Product/technology roadmaps

CUSTOMER FOCUS
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- Key account approach
- Commercial excellence program

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Product Leadership & Autonomous Driving
Andreas Jähnke, SVP Research & Development
Haldex Capital Market Day
9 March 2018
A world of safer vehicles

Product leadership by development and launching leading commercial vehicle control systems for enhanced safety and reliability
Product leadership by development and launching leading commercial vehicle control systems for enhanced safety and reliability.
Innovative Vehicle Solutions

Product leadership by development and launching leading commercial vehicle control systems for enhanced safety and reliability
## Industry trends and technology impact

<table>
<thead>
<tr>
<th>Customer Challenges</th>
<th>Impact on Haldex’ offering</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Cost of Ownership</strong></td>
<td></td>
</tr>
<tr>
<td>▪ Vehicle investment</td>
<td>▪ Vehicle system integration</td>
</tr>
<tr>
<td>▪ Driver wages</td>
<td>▪ Product cost</td>
</tr>
<tr>
<td>▪ Vehicle downtime</td>
<td>▪ Robust design</td>
</tr>
<tr>
<td>▪ Fuel efficiency</td>
<td>▪ Weight optimized solutions</td>
</tr>
<tr>
<td>▪ Optimized payload</td>
<td>▪ Increased electrification</td>
</tr>
<tr>
<td>▪ Service and maintenance</td>
<td>▪ System diagnostics and ease of service</td>
</tr>
<tr>
<td><strong>Environmental Demands</strong></td>
<td></td>
</tr>
<tr>
<td>▪ Emission legislation</td>
<td>▪ Vehicle system integration</td>
</tr>
<tr>
<td>▪ Noise</td>
<td>▪ Product remanufacturing</td>
</tr>
<tr>
<td>▪ CO₂ reduction</td>
<td>▪ Noise reduction</td>
</tr>
<tr>
<td>▪ Waste elimination</td>
<td>▪ Material and manufacturing processes</td>
</tr>
<tr>
<td>▪ End of Life vehicle directive</td>
<td>▪ Rolling resistance</td>
</tr>
<tr>
<td>▪ Aerodynamics</td>
<td></td>
</tr>
<tr>
<td><strong>Vehicle Safety</strong></td>
<td></td>
</tr>
<tr>
<td>▪ Safety legislation</td>
<td>▪ Vehicle system integration</td>
</tr>
<tr>
<td>▪ ABS, ABA, stability control</td>
<td>▪ Autonomous driving and other innovative solutions</td>
</tr>
<tr>
<td>▪ Stopping distance</td>
<td>▪ Increased electrification</td>
</tr>
<tr>
<td>▪ Increased road congestion</td>
<td>▪ Wheel-end dynamics and control</td>
</tr>
<tr>
<td>▪ Market support and product training</td>
<td></td>
</tr>
</tbody>
</table>
INNOVATION

HALDEX DEVELOPMENT PROCESS

GLOBAL R&D STRUCTURE

CULTURE
Technology Road-Map

- Integration of controls, propulsion system and brake system (Blending)
- Elimination of inefficiency losses
- Performance optimization of current technologies
- Material development to reduce weight while increasing strength
- High Performance Pneumatic brake systems and modules
- Sub system controls integration. Wheel end management
- Vehicle specific duty cycle detection for optimized service and maintenance
- Electro mechanical brake modules and system integration
- Level 4 autonomous driving
- Electrical propulsion modules and brake system integration
- Autonomous Transportation Units
5 levels of autonomous driving

**Driver Role**

**Driver Only**
- **Level 0**: Eyes on, Hands on
  - Driver is continuously exercising longitudinal AND lateral control

**Assisted**
- **Level 1**: Eyes on, Hands on
  - Driver is continuously exercising longitudinal OR lateral control
- **Level 2**: Eyes on, Hands off
  - Driver has to monitor the system at all times

**Partial Automation**
- **Level 3**: Eyes on, Hands off
  - System has longitudinal AND lateral control in a specific use case, System recognizes the performance limits and requests driver to resume control within a sufficient time margin

**Conditional Automation**
- **Level 4**: Eyes on, Hands off
  - System has longitudinal AND lateral control in a specific use case

**High Automation**
- **Level 5**: Eyes off, Hands off
  - System can cope with all situations automatically in a defined use case

**Full Automation**
- Driver is not required during defined use case

Mike Lemanski

Innovative Vehicle Solutions
System integration

- Changing vehicle system architecture
- Differentiation only possible via software & system integration
- Smart wheel-ends will enable simplified system architecture & better support of autonomous functionality

Opportunity for Haldex to challenge in Brake Systems on Technology & Performance with an open architecture strategy
Functional layers and system integration

Vehicle Environment
Maps, Sensors, Radar, Lidar, Cameras, Load data

Transportation and logistics
Route planning
Section planning
Situation management
Vehicle Dynamics
Sub systems
Brake systems development overview

**Mechanical**
- Weight reduction & right sizing
- Optimized Performance

**Electro Pneumatic**
- Improved parking brake control
- Shorter stopping distance and better maneuvering
- Improved wheel-end diagnostics

**Electro Mechanical**
- Silent braking
- Optimized stopping distance and maneuvering
- Low energy demand
- Improved wheel-end diagnostics

System Architecture & Controls layer

Wheel-end Actuation & Controls layer
Complete vehicle control architecture

- One common platform for Vehicle/OEM level controls
- Scalability designed into the vehicle system architecture.
- Enabler for Customers to develop advanced vehicle automation functionality inhouse.

Logistics and route planning
Section planning
Situation management
Vehicle Dynamics
Communication Data bus, CAN

Vehicle Dynamics Sub systems
- Steering
- Propulsion
- ICE (Engine)
- Electric motors
- Etc.

Haldex FABV  Haldex EPM  Haldex EMB
Haldex scalable system architecture

<table>
<thead>
<tr>
<th></th>
<th>Conventional EBS</th>
<th>FABV</th>
<th>EMB</th>
<th>EMB in Electric Driveline</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Control</strong></td>
<td>Electric/Dual Pneumatic</td>
<td>Dual Electric</td>
<td>Dual Electric</td>
<td>Dual Electric</td>
</tr>
<tr>
<td><strong>Actuation</strong></td>
<td>Pneumatic-Relay</td>
<td>Pneumatic-Direct</td>
<td>Electric</td>
<td>Electric</td>
</tr>
</tbody>
</table>
Fast acting brake valve

- Fast Acting Brake Valve (FABV)
- Monitored service brake actuation
- Enabler for optimized slip control
- Meets the requirement of future brake control for autonomous driving

Air from reservoir → Air to/from chamber → Air to exhaust

Source: Leon Henderson’s Ph.D. thesis
Fast acting brake valve

15% reduction in stopping distance

STEER AXLE, EBS

STEER AXLE, FABV SLIP CONTROL
Fast acting brake valve
Electro mechanical braking / Brake by wire

- Full Brake by Wire System
- Optimized wheel end control for future architecture and demands
- SWEP Project (2004-2008)
- EU Projects:
  SPARC (2004 – 2007)
  HAVEit (2008 – 2011)
- JV in China with VIE (2016)
Efficiency comparison

EBS

Pneumatic System needs about 2.5x more energy

Input = 6.6

EMB system enables energy savings compared to a pneumatic system due to better efficiency

Output = 1

Input = 2.45

EMB

Electro Mechanical

Innovative Vehicle Solutions
Improved braking performance

Start conditions: 90 km/h, 40 t vehicle weight

ABS and Drum brakes (Brake pressure 8 bar)

Improvement from Disc brakes (Brake pressure 10 bar)

EBS on Trailer

EBS also on Trailer

Electromechanical brakes
Fast Acting Brake Valves

Electro Pneumatic
Electro Mechanical

Physical limit

Braking distance

- 16%
- 7%
- 23%
- 15%
System integration

Simulation Wheel End control potential

- Enhanced vehicle dynamics
- Redundancy safety
- Supports FABV and EMB open architecture set up

Example Steer by Wheel End slip control for torque bias
What does the CV business think?

Key recommendations for stakeholders

**Fleet operators** need to investigate individual benefits of investing into automated trucks
- Analyze potential cost benefits of automated trucks based on characteristics of individual operations
- Evaluate potentials to benefit from fuel cost savings through platooning either between own vehicles or with peers

For **OEMs**, the main task now is to prepare technologically for limited/full self-driving automation
- Further develop ADAS understanding on the vehicle and system level in-house to have relevant knowledge for designing limited/full self-driving trucks
- Partition ADAS based on clearly defined interfaces and responsibilities to facilitate interaction with the supplier base

For **suppliers**, the future focus must encompass both technology and business models
- Develop advanced software capabilities and introduce next generation sensor technologies to approach series production readiness for the stages of limited/full self-driving automation
- Build effective business models for providing OEMs with both complete systems and ADAS components only

- **The government** needs to provide the legal framework that allows adoption of automated truck technology
- Enable testing of automated trucks and clarify liability issues
- Develop legal regulation for driverless truck operation in stage 5

Source: Roland Berger
Questions?
Strategic direction

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Aftermarket Expansion

Walter E Frankiewicz, SVP Sales North America

Haldex Capital Market Day
9 March 2018
Path to market for truck components

Europe

Fleets Choose from Available Pre-Selected Choices Amongst European OEM Options

OE Driven - Develop New Product For OEM Customers – Standard or Optional Position

Truck/Trailer OEM

AM Sell Through OES Channel or Distribution Networks

Aftermarket OES & Distribution

New Vehicles
Vehicle Service
Service Parts

Fleets

Replacement Parts
Service Parts
Bargain Parts
Path to market for truck components

OEM Has Control of Only Original Equipment Specification / Seeks to Satisfy Fleet Demands as Much As Possible

Truck Service Parts, Distributors, Buying Groups and Others Compete for Share of Service Parts Business

Large Fleets Have Significant Leverage to “Demand” Product Through OEM and Service Parts Choices

North America

Focus on OE Position PLUS Data Book Release

Availability and Broad Offering, Brand Recognition

Relationship Selling Product, Brand, Service and Commitment

FLEET OEM

FLEET Trailer

OEM

Truck/Trailer OEM

Aftermarket OES & Distribution
NA aftermarket channel of distribution (parts)

Maintain Support
Total Network and
All Channels of
Parts Sales

Result:
Opportunity to Flex
with Variable
Segment Demand
or Major Trends in
Buying Behavior

OEM Parts

Online Parts

Independent
Parts

Buying
Groups

North America
Fleets
NA aftermarket channel of distribution (parts)

Maintain Support
Total Network and
All Channels of
Parts Sales

Result:
Opportunity to Flex
with Variable
Segment Demand
or Major Trends in
Buying Behavior

Fleet Direct Ship
50%

OEM Parts

Buying Groups
25%

North America Fleets

Result: Opportunity to Flex with Variable Segment Demand or Major Trends in Buying Behavior
NA aftermarket business snapshot

2017 Aftermarket Revenue ~$147M USD

Most Rapidly Growing Segments
- Disc Brake
  - New All Makes Friction Program – Fras-Le
  - Increase in ADB Market Penetration – Organic
- New Product/Offering Growth
  - Adjacent Products
  - Logical Pass-Thru Products
  - “Second Brand Strategy”
  - Second Owner and Beyond in Life Cycle

Most Rapidly Growing Channels
- Online Parts Retail
  - Driven by Buying Behaviors of Fleets
    - Age of Operators
  - Buying Groups
  - Consolidation of Independent Distributors
Aftermarket Opportunity

- Follow vehicle from the factory to the end of its life
- Understand the needs of different owners throughout entire vehicle lifecycle
- Develop our product portfolio that match the transitioning needs of those owners

STRATEGIC OBJECTIVES
- Aftermarket revenue growth
- Second brand revenue growth
- E-commerce revenue growth
- Aftermarket recapture of OE installed products

Original Owner

2+ Owner

Vocational

Owner/Operator
Questions?
Increased demand for break adjusters in China

Åke Bengtsson, CEO
Haldex Capital Market Day
9 March 2018
New legislation drives demand for brake adjusters

- New legislation in China from 1 January 2018.
- All new heavy vehicles must have automatic brake adjusters.
- Manual brake adjusters are widely used today.
Manual vs Automatic brake adjusters

- When the gap between the brake drum and the brake lining is increased, due to brake lining wear, the brake adjuster need to be adjusted.

- Manual brake adjusters (MBA) need regular adjustment, often several times per week.

- Automatic brake adjusters (ABA) are keeping stroke within limits automatically.

- Self-setting automatic brake adjuster (S-ABA) does not require manual adjustment at installation.
Local alliances / JV's
China commercial vehicle production volume

- **GB1589**
- 4 trillion investment for infrastructure

Graph showing production volume from 2008 to 2019 for different types of vehicles: HD Trucks, MD Trucks, M & L Buses, and Trailer.
China OEM ABA market

2017

- Haldex: 30%
- Longzong: 30%
- Aodi: 30%
- Others: 25%

Total Volume 12.5 M units

2017: 6.6 M units
2018: 12.9 M units
China OEM ABA market

- HDV
- MDV
- LDV
- Bus
- Trailer

Build rates
ABA Volumes
Questions?
From Drum Brakes to Disc Brakes in North America

Walter E Frankiewicz, SVP Sales North America

Haldex Capital Market Day
9 March 2018
2017-2025 ADB NA launch strategy

ADB business ongoing since 2000 in North America

- 2005 Knorr-Bremse brings 2-tappet design to North America for truck and tractor segment
- 2010 Meritor focuses on transit segment with heavy duty brake
- 2012 Wabco begins in earnest to develop trailer brake on 1-tappet design platform
- 2010-2016 Haldex banned from USA market due to infringement of Knorr-Bremse patent enforced by Bendix-Spicer Foundation Brake
2017-2025 ADB NA launch strategy

Haldex Approach – Leverage strengths with Modul-T sequentially:

1. Drive Profitable Revenue Immediately with Developing Aftermarket of PADS
2. Trailer segment (lowest hurdle)
3. Truck/tractor segment (highest volume)
4. Transit segment (ADB is already 95% penetration in this segment)

North American ADB Market Development vs Haldex Business Plan

- Trailer ADB Market
- Truck/Tractor ADB Market
- Transit/Bus ADB Market

- 1- Haldex Modul-T
- 2- Haldex LD/MD
- 3- Haldex Modul-T/X
ADB market assessment – Take rate of ADB

**NAVISTAR**
- Linehaul Tractors
  - 60% Take Rate on Steer Axles
  - 20% Take Rate on Drive Axle(s)

**VOLVO TRUCKS**
- Linehaul Tractors / Vocational Trucks
  - 35% Take Rate on Steer Axles
  - 15% Take Rate on Drive Axle(s)

**PACCAR**
- Linehaul Tractors / Vocational Trucks
  - 48% Take Rate on Steer Axles
  - 28% Take Rate on Drive Axle(s)

**FREIGHTLINER**
- Daimler Trucks NA (Linehaul Tractors)
  - 15% Overall Take Rate in 2016
  - 25% Take Rate Overall in 2018
ADB prices/trends – North America
Validation for Core ADB Penetration Assumptions . . .

Historical / Future Trend - Prices

Cost (€)

ADB Transition Rate: 20% to 70%

ADB Growth in NA:

Source: WE Frankiewicz
NA trailer ADB path to market – both push & pull

Design and Produce ADB Calipers

Drive Suspension MFR to Release Haldex ADB (Standard/Option)

Drive Trailer MFR to Release & Specify Haldex ADB (Standard/Option)

Market & Sell Haldex Value Directly to the Fleet (Payback, Maintenance, Value, etc)

Fleets – End Users

Suspension Manufacturers

NA Manufacturer Examples

Product Manufacturer

NA trailer ADB path to market – both push & pull

Innovative Vehicle Solutions
### NA truck ADB positions/path to market

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Fleets Help Obtain Optional Releases at OEMs
Questions?
Haldex as an investment case

- Increased transportation needs and improved infrastructure
- Sustainable and safe solutions needed
- Cost efficiency

- Connectivity
- Electrification
- Autonomous driving
Questions?

Thank You!