

## SECTOR IN-DEPTH

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## Freight railroads - North America

## Expanding interest in precision railroading may lead to service improvement

- » **Increasing adoption of precision scheduled railroading may help reverse deterioration in average service levels.** Expanding interest among North American railroads in precision scheduled railroading has the potential to improve flagging service levels. Last week, Union Pacific Corporation became the latest North American Class 1 railroad to adapt its operating model to the principles of precision scheduled railroading. Under its new Unified Plan 2020 operating plan, the company will roll out precision scheduled railroading in phases across its entire rail network, beginning October 1, 2018 on its eastern North/South corridor. Class 1 railroads embracing precision scheduled railroading now account for the majority of the North American rail sector.
- » **Industry averages for train speed and terminal dwell lag historical levels.** The rail sector's increasing adoption of this operating model comes at a time of prolonged weakness in train speeds and terminal dwell times. The latest round of pronounced deterioration began in the first quarter of 2017 as freight volumes rebounded following significant declines during mid 2015 and through 2016. Service levels eroded further between March and August of this year amid accelerating freight growth during this period.
- » **Service levels improve at railroads using precision scheduled railroading.** Railroads that have implemented precision scheduled railroading have demonstrated a marked improvement in service levels by some measures. CSX Corporation provides the most recent illustration, even though a rapid network-wide implementation initially led to significantly worsened service levels. CSX's train speed in the third quarter of 2018 increased to only 2% below its average level in 2013, a base line year that we use for the industry during which railroads sustained good service levels. Furthermore, terminal dwell time for CSX dropped to 16% below its 2013 average.
- » **Precision scheduled railroading is not a panacea for service problems.** Even with an operating model based on precision scheduled railroading, railroads will periodically experience weaker service levels, particularly during sharp increases in freight volumes. Canadian National Railway Company, an early adopter of precision scheduled railroading, experienced a considerable deterioration in service metrics commencing in the fourth quarter of 2017. At the same time, Burlington Northern Santa Fe LLC, which has not embraced precision scheduled railroading, has maintained good service levels that to date exceed its average 2013 levels. In addition, precision scheduled railroading's primary objective is to increase the efficiency of operations, which could come at the expense of the railroad's ability to accommodate customer needs.

## Increasing adoption of precision scheduled railroading may help reverse deterioration in service levels

Expanding interest among North American railroads in precision scheduled railroading has the potential to improve flagging service levels. While it cannot prevent periodic declines in average train speeds or upticks in terminal dwell times (i.e., the length of time that a railcar resides in a terminal), precision scheduled railroading has by some measures demonstrated a marked improvement in service among railroads that have adopted it.

Earlier this week, [Union Pacific Corporation](#) (Baa1 stable) became the latest North American Class 1 railroad to adapt its operating model to the principles of precision scheduled railroading. Under its new Unified Plan 2020 operating plan, the company will roll out precision scheduled railroading in phases across its entire rail network, beginning October 1 on its eastern North/South corridor. With the addition of Union Pacific, Class 1 railroads embracing precision scheduled railroading now account for the majority of the North American rail sector, including [Canadian National Railway Company](#) (A2 stable), [Canadian Pacific Railway Company](#) (Baa1 stable) and [CSX Corporation](#) (Baa1 stable).

Precision scheduled railroading is a railroad operating model centered around a streamlined train schedule that focuses on asset utilization, efficiency of operations, velocity and customer service. The operating model aims to improve customer service by more punctual on-time departures and arrivals, swifter shipping times and more frequent train service, and to do so with a high degree of consistency and reliability. It enables better service levels by operating longer trains, converting more trains to manifest (i.e., general-purpose) trains, increasing train speed and expediting the handling of freight cars at rail yards and terminals. As a result, the model typically leads to a marked increase in car miles per day, while lowering the number of cars on the network at the same time.

Nonetheless, the model's train schedule is established with the primary objective to enhance the efficiency of railroad operations. This narrows the scope to accommodate customer needs and may cause customers having to adapt to the railroad's train schedule. In addition, a material reduction in capital expenditures concurrent with the implementation of precision scheduled railroading may affect the railroad's ability to maintain good service levels over time if sustained too long.

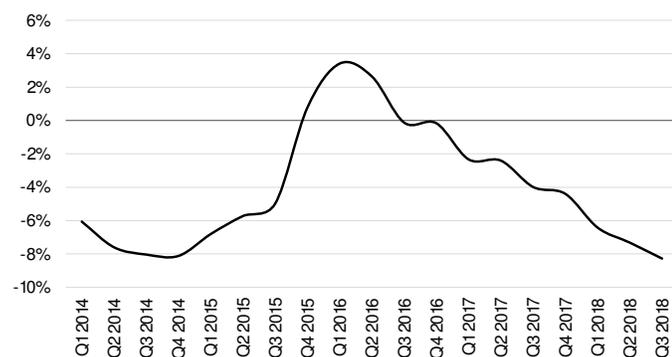
## Industry averages for train speeds and terminal dwell times continue to lag historical levels

The rail sector's increasing adoption of precision scheduled railroading comes at a time of prolonged weakness in service levels. During the last five years, industry averages have mostly fallen short of their levels in 2013, a base line year that we use for the industry during which mild weather and modest freight growth enabled the railroads to sustain good service levels.

Exhibit 1

### Industry average train speed has declined

Percentage change in Class I quarterly train speeds from 2013 levels

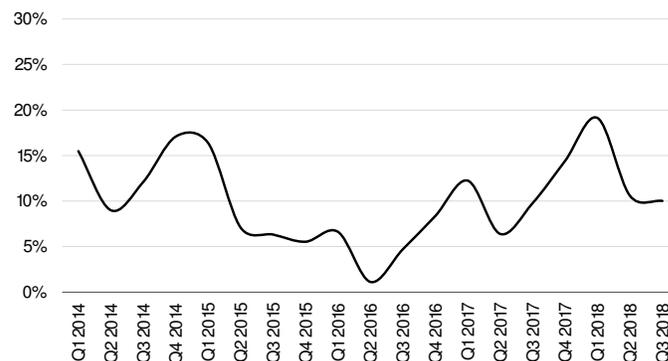


Source: Association of American Railroads, Surface Transportation Board

Exhibit 2

### Industry average dwell times still above levels in 2013

Percentage change in Class I quarterly terminal dwell times from 2013 levels



Source: Association of American Railroads, Surface Transportation Board

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The latest round of pronounced deterioration began in the first quarter of 2017 as freight volumes rebounded following significant declines from mid-2015 through 2016 (see Exhibit 1 and 2). Service levels eroded further between March and August of this year amid accelerating freight growth during this period. The weakening in service levels has been remarkable because adverse weather conditions over this period are unlikely to have contributed materially to the deterioration.

Prolonged weakness in service levels can impair the ability of railroads to attain price increases that exceed rail cost inflation. Weak service levels are also likely to increase labor costs by requiring additional train crews and more overtime and have historically resulted in the acquisition of additional locomotives and railcars.

### Service levels improve at railroads using precision scheduled railroading

Railroads that have implemented precision scheduled railroading have demonstrated a marked improvement in service levels by some measures. CSX provides the most recent illustration of the benefits of precision scheduled railroading, albeit after a very rapid, network-wide implementation of the approach that initially led to significantly worsened service levels in the third quarter of 2017 (see Exhibits 3 and 4). CSX's train speed in the third quarter of 2018 increased to only 2% below its average level in 2013, a far narrower deficit than those seen at most other railroads. In addition, CSX's terminal dwell time dropped for the first time below its 2013 average, by approximately 16% in the third quarter of 2018.

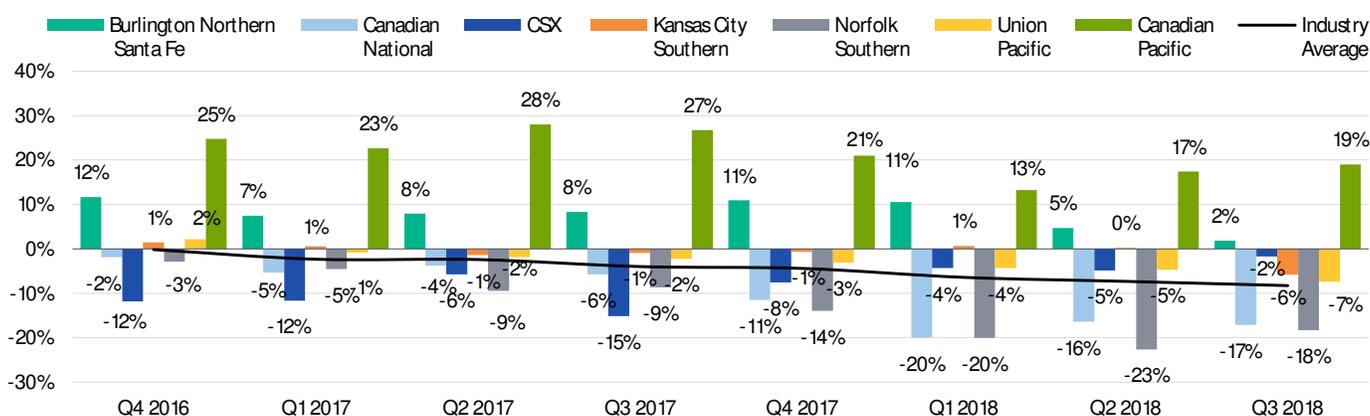
Operational changes that contributed to these improvements include the conversion of seven out of 12 hump yards to flat switching operations, the sorting of cars in blocks rather than individual cars, a 12.5% increase in train length and a decrease in the average number of railcars on the network to currently 118,057, down from about 145,000 to 150,000 in the first quarter of 2017. As a result, CSX managed to increase railcar miles per day to 123.8 in the second quarter of 2018, a 12% increase from a year ago.

Notwithstanding the significant service level improvement measured by velocity and terminal dwell time, we believe that the implementation of precision scheduled railroading at CSX has been aided by flattish freight volumes over the last 12 months, whereas other railroads had to contend with mid-single digit volume growth over this period. In addition, velocity and terminal dwell time are only two indicators of service levels. Data on for example on-time arrivals are not publicly available and little is known about the extent to which customers may had to adapt their transportation needs to CSX's revised operating plan.

Exhibit 3

#### CSX's implementation of precision scheduled railroading aids a recovery in train speed after lagging the industry

Percentage change in Class 1 quarterly train speeds from respective 2013 levels



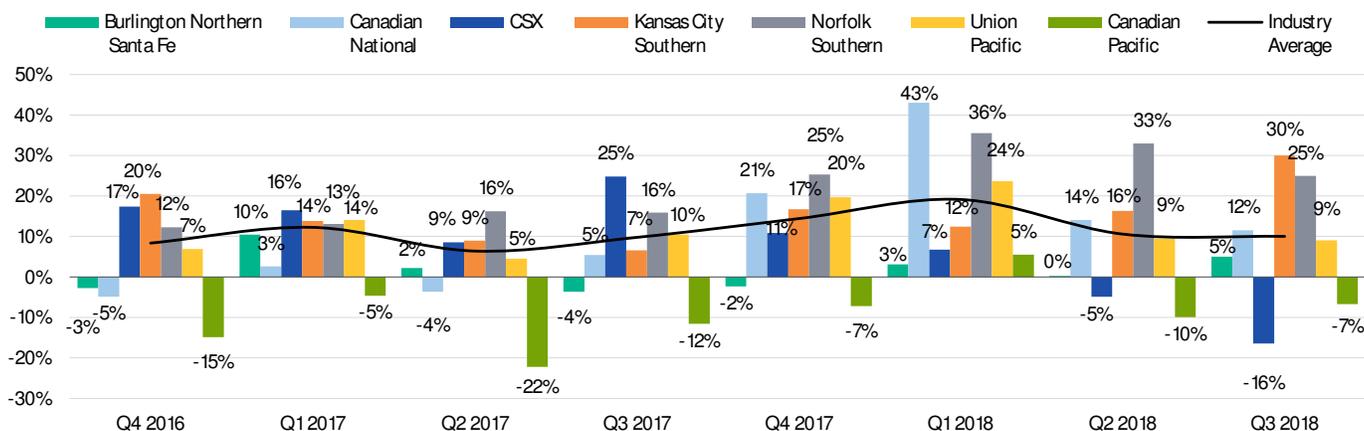
Note: Q3 2018 reflects data as of September 14. Comparisons to 2013 based on average levels for May-December 2013. Industry average excludes Canadian Pacific.

Source: Association of American Railroads, Surface Transportation Board, company information

Exhibit 4

**CSX keeping dwell times below levels in 2013 following adoption of precision scheduled railroading**

Percentage change in Class 1 quarterly terminal dwell times from respective 2013 levels



Note: Q3 2018 reflects data as of September 14. Comparisons to 2013 based on average levels for May-December 2013. Industry average excludes Canadian Pacific.

Source: Association of American Railroads, Surface Transportation Board, company information

**Precision scheduled railroading is not a panacea for service problems**

Even with an operating model based on precision scheduled railroading, railroads will periodically experience weaker service levels, particularly during sharp increases in freight volumes. Canadian National, an early adopter of precision scheduled railroading, experienced a considerable deterioration in service metrics commencing in the fourth quarter of last year when carloads surged 7% amid inclement winter weather, conditions that were exacerbated by network capacity constraints.

Still, the resilience of Canadian National's operating model is reflected in a swift decrease in average terminal dwell time, even though this metric still exceeds the company's historical levels. At the same time, [Burlington Northern Santa Fe LLC](#) (A3 stable), which has not embraced precision scheduled railroading, has maintained service levels that to date still exceed its average 2013 levels.

## Moody's related publications

### Credit Opinions

- » [CSX Corporation: Update to credit analysis following affirmation of ratings, September 2018](#)
- » [Burlington Northern Santa Fe, LLC: Update to credit analysis, September 2018](#)
- » [Canadian National Railway Company: Update to Discussion of Key Credit Factors, June 2018](#)
- » [Kansas City Southern: Update following upgrade to Baa2, June 2018](#)
- » [Union Pacific Corporation: Update following downgrade to Baa1, June 2018](#)
- » [Canadian Pacific Railway Company: Update to credit analysis, April 2018](#)
- » [Norfolk Southern Corporation: Update to Credit Analysis, December 2017](#)

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