

ASSOCIATION  
OF AMERICAN  
RAILROADS

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Senior Vice President - Policy & Economics

June 5, 2018

The Honorable Cynthia T. Brown  
Chief, Section of Administration  
Office of Proceedings  
Surface Transportation Board  
395 E Street, SW  
Washington, DC 20423-0001

Dear Ms. Brown:

This submission is the AAR forecast of the third quarter 2018 All-Inclusive Index and Rail Cost Adjustment Factor, filed in Ex Parte No. 290 (Sub-No. 5) (2018-3) *Quarterly Rail Cost Adjustment Factor*. The versions of RCAF-related indices covered in this filing are: the All-Inclusive Index (initiated in the second quarter of 1985), the Unadjusted RCAF (produced since October 1982), the Adjusted RCAF (first published in the second quarter of 1989), and the RCAF-5 (created by the STB in its Ex Parte No. 290 (Sub-No. 7) decision served October 3, 1996). The table below summarizes the third quarter 2018 results and compares to the previous quarter. Both quarters are shown on a 4Q\2017=100 base.

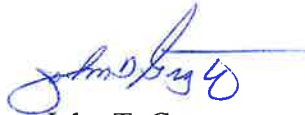
	<u>2018Q2</u>	<u>2018Q3</u>	<u>% Change</u>
All-Inclusive Index	103.9	107.2	3.2
Preliminary RCAF	1.039	1.072	3.2
Forecast Error Adjustment	0.002	-0.011	
RCAF (Unadjusted)	1.041	1.061	1.9
Productivity Adjustment Factor	2.3665	2.3641	
RCAF (Adjusted)	0.440	0.449	2.0
PAF-5	2.5336	2.5298	
RCAF-5	0.411	0.419	1.9

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In its October 3, 1996 decision in Ex Parte No. 290 (Sub-No. 7), *Productivity Adjustment - Implementation*, the STB noted its intent to publish, in addition to the RCAF (Unadjusted) and RCAF (Adjusted), an RCAF-5 (i.e., a calculation of the productivity adjusted RCAF values as if the agency had always used a 5-year rolling average to calculate the productivity adjustment). In response to a request by STB staff, the AAR is including a calculation of the RCAF-5 in its quarterly RCAF filing. The AAR and its members, however, do not believe the publication of a third RCAF index is required or permitted by the applicable statute (49 U.S.C. § 10708) and do not endorse its publication.

Our quarterly non-proprietary work papers underlying this submission are e-filed herewith, in accordance with the ICC's order in Ex Parte No. 290 (Sub-No. 2), *Railroad Cost Recovery Procedures*, served February 8, 1990. We have notified Pedro Ramirez, in the STB office handling this proceeding, of our plan to e-file the submission and non-proprietary work papers. A second copy of the submission and non-proprietary work papers, plus selected highly confidential work papers, will be hand-delivered to Mr. Ramirez's Data Collection and Auditing Team. All work papers are available for STB inspection. Questions should be directed to me or Clyde Crimmel (202 639-2309) of this office.

Sincerely,



John T. Gray

Attachments

**Third Quarter 2018  
All-Inclusive Index**

**Ex Parte No. 290 (Sub-No. 5) (2018-3)**

**Quarterly Rail Cost Adjustment Factor  
Surface Transportation Board**

**Policy and Economics Department  
Association of American Railroads**

**June 5, 2018**

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## Introduction

On January 2, 1985, the Interstate Commerce Commission (ICC) adopted the All-Inclusive Index as the basis for the Rail Cost Adjustment Factor (RCAF). The quarterly projection of railroad costs, as documented herein, employs the All-Inclusive Index as required by the regulations. Also presented in this submission is the RCAF, both Adjusted and Unadjusted, as required by the ICC in its decision in Ex Parte No. 290 (Sub-No. 4), Rail Cost Recovery Procedures - Productivity Adjustment, served March 24, 1989. In addition, the AAR has included the RCAF-5, which was instituted by a Surface Transportation Board decision served October 3, 1996 in Ex Parte No. 290 (Sub-No. 7), *Productivity Adjustment - Implementation*. The AAR and its members do not believe the additional productivity-adjusted index is required or permitted by the applicable statute, and do not endorse its publication.

This quarter's projection of railroad costs is for the third quarter 2018. Four more labor unions have new national labor agreements, and all of the new contracts have 2.5 percent general wage increases effective July 1.

## Index Weights

In the Ex Parte No. 290 (Sub-No. 2) final rules, issued in April 1981, the Interstate Commerce Commission mandated that the weights of each major cost component be updated annually. These "external" weights are calculated using data from Schedules 410 and 210 of the R-1 annual report filed with the Surface Transportation Board by the Class I railroads. The weights are typically updated with the fourth quarter projection.

The 2016 (current) and 2015 (previous) weights are shown below. Weights calculated from 2015 data were used for the fourth quarter of 2016 through the third quarter of 2017. Beginning with the fourth quarter of 2017, weights calculated using 2016 data are used.

Traffic and fuel prices were down again in 2016, causing expenses for most categories to decline. The Fuel and Materials & Supplies categories had double-digit percentage decreases in expenses, and this caused them to be the two categories that had decreases in weights. Depreciation and Interest, the two categories with increased expenses in 2016, had increases in their weights. While Labor, Equipment Rents, and Other all had 5 to 6 percent decreases in expenses, their weights increased because of the larger drops for Fuel and Materials & Supplies. Weights for Labor and Other are the highest they have been since 2004, while Fuel's weight is the lowest it has been since 2003. Depreciation's weight, perhaps pushed by recent spending for Positive Train Control, is the highest it has ever been.

<b>Weights for RCAF's All-Inclusive Index</b>		
	<b>2016</b>	<b>2015</b>
Labor	35.6 %	35.0 %
Fuel	10.7	13.4
Materials & Supplies	5.0	5.4
Equipment Rents	5.9	5.8
Depreciation	15.6	13.9
Interest	2.2	1.9
Other	25.0	24.6
<b>Total</b>	<b>100.0</b>	<b>100.0</b>

Reweightings of the index is accomplished by calculating both the current quarter (normally the fourth) and prior (normally the third) quarter indexes with the new weights. The relative change between the two quarters is then multiplied times the prior quarter (usually the third) *linked* index. Use of this method ensures that the weight change, by itself, does not cause a change in the level of the All-Inclusive Index.

Internal weights in the labor and equipment rents components are updated at the same time as the external weights. When these weights are changed, they are also linked using the procedure described above in order to eliminate the effect of the change in weighting.

## All-Inclusive Index Third Quarter 2018

The components and values of the current and previous All-Inclusive Indexes are shown below. Details of the construction of each component of the index are contained in the Appendices.

	2016 Weights	Forecast		Percent Change
		Previous 2018Q2	Current 2018Q3	
1. Labor	35.6%	422.5	434.3	2.8 %
2. Fuel	10.7%	248.9	291.0	16.9
3. M&S	5.0%	258.0	263.7	2.2
4. Equipment Rents	5.9%	228.9	230.5	0.7
5. Depreciation	15.6%	224.6	223.5	-0.5
6. Interest	2.2%	60.5	60.5	0.0
7. Other	25.0%	229.5	231.5	0.9
8. Weighted Average				
a. 1980 = 100		297.2	306.6	
b. 1980 = 100 (linked)		274.9	283.6 <sup>1</sup>	
c. 4Q17 = 100		103.9	107.2 <sup>2</sup>	3.2

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<sup>1</sup> Index80 = (Current Index / Previous Index) \* the Previous Quarter Linked Index  
= (306.6 / 297.2) x 274.9  
= 283.6

<sup>2</sup> To calculate the 4Q17 = 100 index:

Index4Q17 = (Current Linked Index / 4Q17 Basing Factor) \* 100  
= 283.6 divided by 264.5 times 100  
= 107.2

Indexes based on other periods:      4Q12 based index = 283.6 / 297.6 x 100 = 95.3  
4Q07 based index = 283.6 / 245.9 x 100 = 115.3  
4Q02 based index = 283.6 / 192.1 x 100 = 147.6  
4Q97 based index = 283.6 / 173.2 x 100 = 163.7  
4Q92 based index = 283.6 / 156.9 x 100 = 180.8

## Forecast vs. Actual All-Inclusive Index First Quarter 2018

Because of data availability, the forecast error adjustment has a two-quarter lag from each filing. As shown below, the first quarter actual index of 102.7 is 1.1 index points below the forecast value of 103.8. Therefore, the forecast error adjustment for third quarter 2018 is -1.1 index points.

	2016 Weights	First Quarter 2018		Amt Difference
		Forecast	Actual	
1. Labor	35.6%	423.8	419.6 <sup>1</sup>	
2. Fuel	10.7%	248.4	254.6	
3. M&S	5.0%	251.0	251.0	
4. Equipment Rents <sup>2</sup>	5.9%	226.7	227.5	
5. Depreciation	15.6%	226.8	223.8	
6. Interest	2.2%	60.5	60.5	
7. Other	25.0%	226.9	228.5	
8. Weighted Average				
a. 1980 = 100		296.8	296.0	
b. 1980 = 100 (linked)		274.5	271.6 <sup>3</sup>	
c. 4Q17 = 100 <sup>4</sup>		103.8	102.7	-1.1

**Forecast error** —————> **-1.1 index points**

<sup>1</sup> This rare occurrence of Labor's actual not being equal to the forecast was caused by a change in health & welfare costs made after the first quarter RCAF filing. For more information, see page 2 of Appendix A in the 2018Q2 RCAF filing submitted March 5, 2018.

<sup>2</sup>

	2016 Weights	First Quarter 2018	
		Forecast	Actual
Car-Hire	58.3%	207.5	207.1
Lease Rentals	41.7%	226.9	228.5
Weighted Average		215.6	216.0
Weighted Average (linked)		226.7	227.5

<sup>3</sup> Linked actual index = (actual index / previous actual index) x previous linked actual index.  

$$271.6 = 296.0 / 291.7 \times 267.7$$

<sup>4</sup> The 4Q17 based indexes are 1980 based indexes divided by the 4Q17 basing factor (264.5/100). Other basing factors are: 4Q12 = 297.6; 4Q07 = 245.9; 4Q02 = 192.1; 4Q97 = 173.2; and 4Q92 = 156.9.



# Productivity

On February 8, 2018, the Surface Transportation Board (STB) served a decision in Ex Parte 290 (Sub-No. 4) which proposed to adopt -0.4 percent as the geometric average productivity change for the five most recent years available. Their five year rolling geometric average calculation added the year 2016 and removed the year 2011. The components of this average annual value are shown on the following table in ratio format – therefore, 0.996 is the same as a decrease of 0.4 percent. Productivity changes are calculated by multiplying each of the five productivity changes together and taking the result to the one-fifth power. The productivity adjustment factors (PAF) for each quarter are calculated by increasing the previous quarter's PAF by quarterly versions of the annual rate, which are the fourth root of the geometric average annual growth rate. The difference between the PAF and the PAF-5 is the timing of the five-year productivity trend.

<b>Comparison of Output, Input, &amp; Productivity</b>			
<b>2012 - 2016</b>			
Year	Output Index (1)	Input Index (2)	Productivity Changes (3)
2012	1.007	0.999	1.008
2013	1.022	1.018	1.003
2014	1.055	1.036	1.018
2015	0.913	0.972	0.939
2016	0.955	0.941	1.015
<b>Average</b>			<b>0.996</b>
Previous Average (2011-2015)			0.994

<b>Calculation of PAF and PAF-5</b>			
For 2012-2016, use fourth root of avg. productivity change = 0.9990			
For 2011-2015, use fourth root of avg. productivity change = 0.9985			
Quarter	Year	PAF	PAF-5
Q1	2018	2.3689	2.5374
Q2	2018	2.3665	2.5336
Q3	2018	2.3641	2.5298
Q4	2018	2.3617	2.5260
Q1	2019	2.3593	2.5235

## Rail Cost Adjustment Factor Third Quarter 2018

Four RCAF values are presented in this filing. Two are not modified for productivity (Preliminary RCAF and RCAF Unadjusted), and two incorporate a productivity calculation (RCAF Adjusted and RCAF-5). The All-Inclusive Index and all four RCAF values, plus the percent change for each, are shown below. Note that beginning with the 2018Q1 index, the All-Inclusive Index was rebased to a 2017Q4=100 basis as required in the applicable statute.

	Previous 2018Q2	Current 2018Q3	Percent Change
All-Inclusive Index <sup>1</sup>	103.9	107.2	3.2
Preliminary RCAF <sup>2</sup>	1.039	1.072	3.2
Forecast Error Adjustment <sup>3</sup>	<u>0.002</u>	<u>-0.011</u>	
RCAF (Unadjusted) <sup>4</sup>	1.041	1.061	1.9
Productivity Adjustment Factor <sup>5</sup>	<u>2.3665</u>	<u>2.3641</u>	
RCAF (Adjusted) <sup>6</sup>	0.440	0.449	2.0
PAF-5 <sup>7</sup>	2.5336	2.5298	
RCAF-5 <sup>8</sup>	0.411	0.419	1.9

<sup>1</sup> See All-Inclusive Index on page 3.

<sup>2</sup> All-Inclusive Index divided by the All-Inclusive Index in the base period (100.0).

<sup>3</sup> The current figure is from Forecast vs. Actual All-Inclusive Index in this filing (page 4). The previous quarter figure is shown in a similar section of the previous quarter's filing.

<sup>4</sup> Preliminary RCAF plus the forecast error adjustment.

<sup>5</sup> See Productivity on page 5.

<sup>6</sup> RCAF (Unadjusted) divided by the Productivity Adjustment Factor (PAF).

<sup>7</sup> See Productivity on page 5.

<sup>8</sup> RCAF (Unadjusted) divided by the PAF-5.

# Appendixes

## Labor

### Third Quarter 2018

The third quarter 2018 Labor Index increased 2.8 percent from the previous quarter. A general wage increase in the national labor agreements, four new national agreements with back pay, and higher taxable earnings caused most of the change.

#### Wage Rate Index

The Wage Rate Index portion of the Labor Index is up 3.5 percent. July wage increases were 2.5 percent for the national unions. Back pay was added for four new national labor agreements.

**New National Agreements:** Four more (BMW, IBBM, IBEW and SMART-MD<sup>1</sup>) new national labor agreements were signed in April and May. The BMW is one of the largest unions in terms of employees represented. The new contracts follow the same pattern as the others ratified earlier. They have a wage increase, effective January 2015, that was received at that time, and was mutually negotiated to apply as the first increase in the new five-year agreements. The new agreements also have two retroactive (July 2016 and July 2017) wage increases of 2 percent, and a 2.5 percent increase effective July 1, 2018. A future wage increase of 3.0 percent will be added to the July 2019 index. One continuing independent agreement has a provision that says it will copy the general wage increases in any new national agreement, so its wage rate was updated and back pay given.

**Wage Increases:** All of the new national labor agreements have a 2.5 percent general wage increase scheduled for July 1, 2018.<sup>2</sup> One national union (IAM) has not ratified a new agreement, so it did not receive the wage increase. The wage increase was also applied to two independent labor agreements that copy the national agreement wage increases. A 3.0 percent wage increase for July was applied to the index for one on-going independent labor agreement.

**Lump Sums:** The third quarter lump sum rate is unchanged from the previous quarter. One amount was fully amortized and removed, but it was replaced by a bonus of similar size for the new quarter.<sup>3</sup>

**Back Pay:** Retroactive wage increases in four new national labor agreements, plus one independent agreement, caused a big increase in the back pay rate. The retroactive wage increases were 2 percent effective July 1, 2016, and 2 percent effective July 1, 2017. These increases, which included one very large employee group (BMW), caused the back pay rate to rise from \$0.799 to \$1.232. The back pay rate has been close to this high before. After the 2012-round of new labor agreements, the back pay rate in the 2012Q3 RCAF filings was \$1.092. As always, back pay amounts will be removed from the index after they have been amortized for four quarters.<sup>3</sup>

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<sup>1</sup> SMART-Mechanical Division now represents those formerly represented by the SMW. See Appendix H

<sup>2</sup> The AAR benchmarked independent unions in independent groups in the Q4 rebenchmarking. Since that time, some formerly independent unions for certain railroads have joined national agreements. Although those unions continue to be benchmarked in an independent group for index calculation purposes, their wage rates are being updated by the national agreement wage increases.

<sup>3</sup> Index procedure, decided by the Interstate Commerce Commission in 1988, is to amortize lump sums and/or back pay over four quarters using the rates for 13-week (a.k.a. 3-month) U.S. Treasury bills.

## Labor

### Third Quarter 2018

**Other:** In wages, "Other" contains the amortization of incentive compensation payments (similar to lump sums) that one railroad makes each year to its dispatchers, yardmasters, and locomotive engineers. The payment total for performance in 2016 that was paid in 2017 has been fully amortized and removed, and has been replaced by the payment total for performance in 2017 that was paid in 2018. The payments in 2018 were higher than the previous year, causing the rate to increase from \$0.136 to \$0.177.

### Supplements Index

The Supplements Index increased 1.8 percent. Higher taxable earnings and higher railroad contributions to employee stock and 401(k) plans caused the increase.

**Health & Welfare:** The 2018Q3 Health & Welfare rate is unchanged.

**Railroad Retirement:** The Railroad Retirement rate increased 22.1 cents (or 2.6 percent). The change was caused by higher taxable earnings resulting from regularly scheduled July wage increases plus new labor agreements with retroactive wage increases that caused back pay.

**Unemployment Insurance:** The Unemployment Insurance tax rate increased by one tenth of one cent (\$0.001) from the previous quarter. High taxable earnings caused the increase.

**Other:** The "Other" category is a reflection of all other fringe benefits, and currently contains known employer contributions to employee 401(k) accounts and employer contributions to employee stock plans that are recorded as fringe benefits. The third quarter rate increased 9.8 cents as bonus matches and perfect attendance stock awards were paid.

### Labor Index Calculation

As shown in Table A-1 on the next page, the 3.5 percent increase in the Wage Rate Index combined with the 1.8 percent increase in the Supplements Index combined to cause the Labor Index to climb 2.8 percent. The linked third quarter 2018 Labor Index is 434.3, which is 2.7 percent higher than one year ago.

## Labor Third Quarter 2018

**Table A-1 Labor Index**

	2018Q2	2018Q3	Change	
			Percent	Amount
<u>Base Wage</u> – Straight Time & Pay For Time Not Worked	\$40.997	\$41.993	2.4%	\$0.996
Adjustments:				
Lump Sum	0.390	0.390	0.0%	\$0.000
Back Pay	0.799	1.232	54.2%	\$0.433
Other	0.136	0.177	30.1%	\$0.041
<b>Total Wages</b>	<u>42.322</u>	<u>43.792</u>	3.5%	\$1.470
Health & Welfare Benefits	8.101	8.101	0.0%	\$0.000
RR Retirement & Medicare	8.646	8.867	2.6%	\$0.221
Unemployment Insurance	0.364	0.365	0.3%	\$0.001
Other	0.190	0.288	51.6%	\$0.098
<b>Total Supplements</b>	<u>\$17.301</u>	<u>\$17.621</u>	1.8%	\$0.320
Total Labor (as info only)	\$59.623	\$61.413		
<b>Wage Index<sup>1</sup></b>	362.2	374.8	3.5%	
<b>Supplements Index<sup>2</sup></b>	639.4	651.2	1.8%	
Total labor Index, 2016 Weights <sup>3</sup>	443.1	455.5		
<b>Labor Index (linked)<sup>4</sup></b>	<b>422.5</b>	<b>434.3</b>	2.8%	

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<sup>1</sup> 1980 wage rate \$11.685

<sup>2</sup> 1980 supplements rate \$2.706

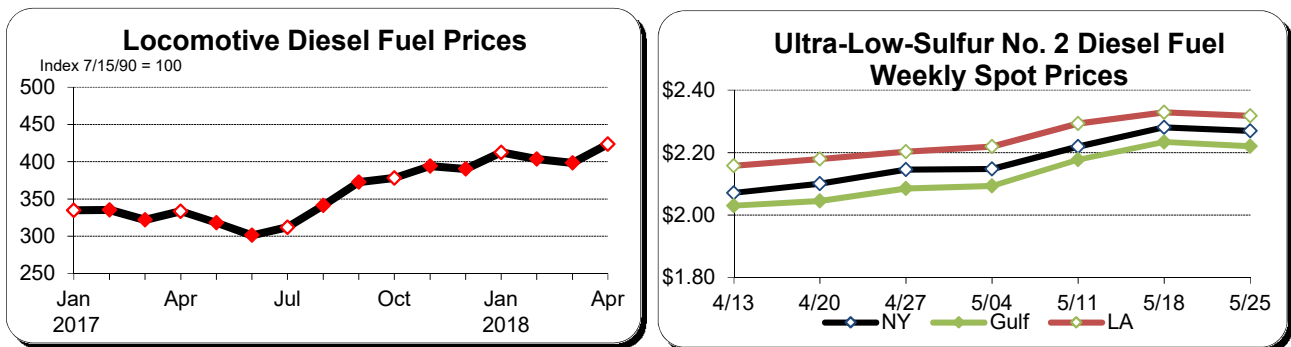
<sup>3</sup> 2016 weights: wages, supplements 70.8% 29.2%

<sup>4</sup> 2018Q3 linked Index = 2018Q2 linked x (2018Q3 / 2018Q2)  
= 422.5 x 455.5 / 443.1

## Fuel Third Quarter 2018

The forecast for fuel is based on: (1) a survey of railroad fuel purchasing officers concerning current price and volume levels, (2) expectations of railroad purchasing officers based on their own forecast models and discussions with their major suppliers, and (3) a consensus of petroleum industry experts and general business publications. Fuel purchases are assumed to remain in inventory for 30 days before the fuel is consumed (and therefore expensed). Therefore, prices *paid* in the first month of each quarter are for fuel *expensed* in the second (or middle) month of the quarter, and the middle month expensed is used to represent each quarter.

The average locomotive diesel fuel price has been trending upward since June 2017. While average prices for locomotive diesel fuel are available only through April 2018, data through four weeks of May are available for related fuel types. According to the Energy Information Administration, weekly spot prices for Ultra-Low-Sulfur Diesel Fuel\* for the week ended May 25 are 8 to 9 percent higher than they were for April. The chart below (on left) shows the AAR's Monthly Locomotive Diesel Fuel Price Index from January 2017 through April 2018. The second chart (on right) shows recent spot prices for Ultra-Low-Sulfur No. 2 Diesel Fuel as reported by the Energy Information Administration.



Earlier in the month, the U.S. Energy Information Administration increased its crude oil\*\* and gasoline price forecasts for 2018. The reasons cited for the increased crude oil price expectation were "falling global oil inventories, heightened market perceptions of geopolitical risks, and strong global economic growth signals." Railroads also expect higher prices for locomotive diesel fuel. Prices for Q3 (July 2018) are expected to be 11.3 percent higher than the average price railroads actually paid in April. Because the Q2 (April) forecast was too low, the Q3 forecast is 16.9 percent higher than the previous (Q2) forecast.

Forecast Fuel Index (1980 = 100)	291.0
Change from previous quarter forecast	16.9%
Change from previous quarter actual	11.3%

\* Heating oil, Ultra-Low-Sulfur No. 2 Diesel Fuel, and locomotive diesel fuel are part of a group of closely related products, commonly labeled as distillates, that differ mostly by their sulfur content. Because of these similarities, these fuels are produced together and have similar pricing trends.  
 \*\* Diesel fuel used by locomotives is made from refined crude oil, and therefore usually has some price correlation.

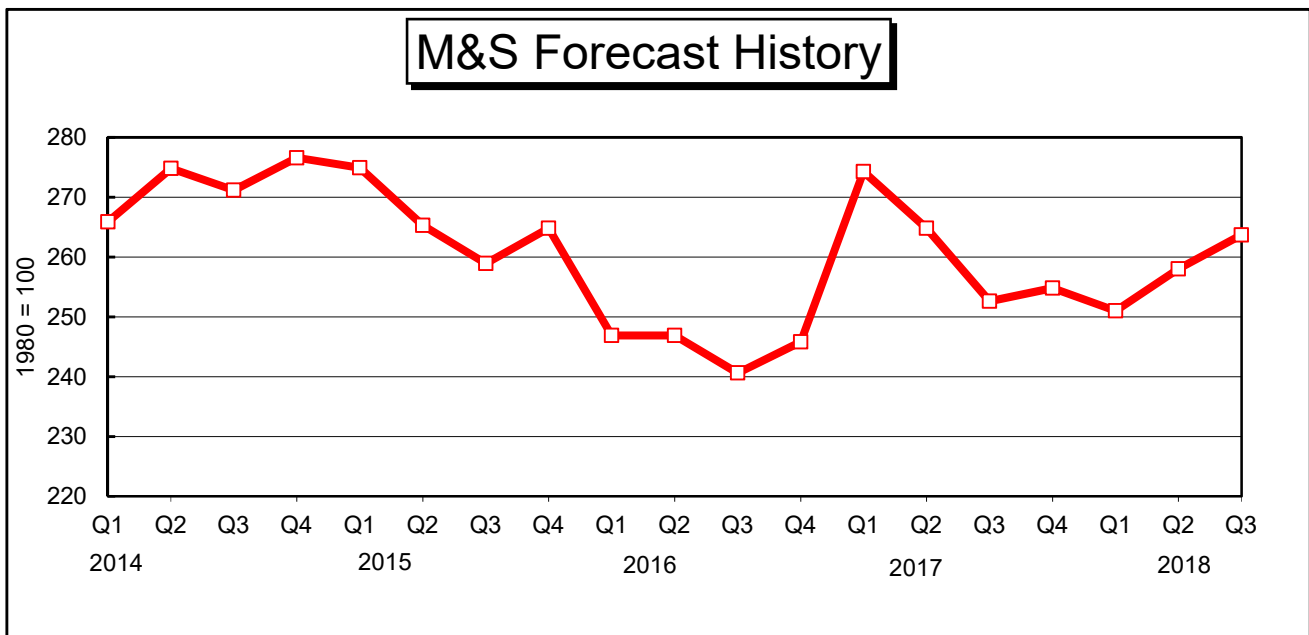
## Materials & Supplies Third Quarter 2018

The third quarter 2018 Materials & Supplies Index is up 2.2 percent from the previous quarter. Prices for Metal Products and Miscellaneous Products were up over 3 percent, while prices for Forest Products were down nearly 3 percent. Despite the overall increase, the Material & Supplies Index remains lower than its values for all of 2014.

2018Q3 Materials & Supplies Index = 263.7

2018Q2 Materials & Supplies Index = 258.0

Difference	5.7 basis points
	or
	2.2 %





## Equipment Rents Third Quarter 2018

The Equipment Rents Index consists of two components – car hire and lease rentals. The methodologies used to create these two components, and the final Equipment Rents Index, are explained below.

### Car Hire

The car hire component is indexed using data from the Car Hire Accounting Rate Master (CHARM) file. Car hire rates for the forecast quarter are estimated based on data for active freight cars using the most recent data available. For the first quarter, December 1 of the previous year is typically used. For the second, third and fourth quarters; March 1, June 1, and September 1 are usually used, respectively. Using data retrieved from the latest CHARM file, an average rate per car is developed. Next, those average rates are grouped into four car type categories to create an overall summary of car hire rates. The summary rates are then compared from quarter to quarter, and weighted, to determine the Car Hire Index.

### Lease Rentals

The lease rentals portion of the Equipment Rents Index uses the Producer Price Index for Industrial Commodities less Fuel and Related Products and Power (PPI-LF). The Commission adopted this surrogate in its decision served March 13, 1987. The AAR uses six years of historical data to derive its forecast for the PPI-LF. The forecast is used not only for lease rentals, but also for the "Other" component of the All-Inclusive Index. Appendix G discusses the forecast in more detail.

### Equipment Rents Index Calculation

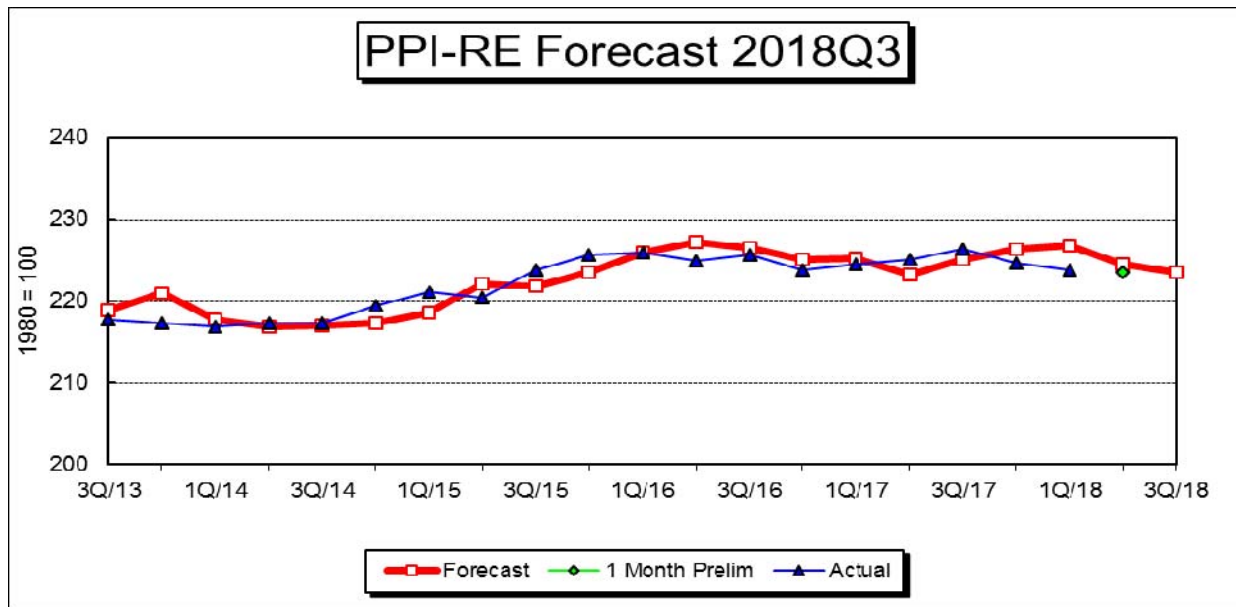
The table below shows the results of the Equipment Rents Index calculation. The third quarter Car Hire portion of the Index rose 0.6 percent because of higher rates for autoracks and privately-owned cars. A 0.9 percent increase for the projected PPI-LF (See Appendix G) used as a proxy for Lease Rentals, combined with the 0.6 percent increase for Car Hire, caused the Equipment Rents Index to rise 0.7 percent.

	2016	2018Q2	2018Q3	Percent
	Weight			Change
Car Hire	58.3%	209.2	210.4	0.6 %
Lease Rentals	41.7%	229.5	231.5	0.9
Weighted Average		217.7	219.2	0.7
Weighted Average (Linked)		228.9	230.5	0.7

## Depreciation Third Quarter 2018

The Producer Price Index for Railroad Equipment (PPI-RE) is used to index depreciation expense. The PPI-RE is forecast using an ARIMA (Auto-Regressive Integrated Moving Average) process where a statistical package picks the model that best fits the historical data set (see next page), and that model is then used for the forecast. The historical data set contains 6 years of monthly data (a sample size of 72), where the most recent available data point is the first month of the quarter prior to the forecast quarter. For a first quarter forecast, the most recent month of data available would be for October of the prior year. For a second quarter forecast, January would normally be the most recent period available. April and July would be the most recent months available for third and fourth quarter forecasts, respectively. The output from the forecast model is shown on page 2 of this appendix on a 1982=100 basis. The figure forecast by the model is a 0.5 percent decrease from the previous quarter's forecast, and reflects recent monthly values that have been relatively stable with the exception of January.

Forecast of Depreciation Index (1982=100)	202.0
Forecast of Depreciation Index (1980=100)	223.5
Change from previous quarter forecast	-0.5%
Change from actual first month of previous quarter	0.0%
Change from same quarter of prior year (actual)	-1.2%



## Depreciation Third Quarter 2018

### PPI RAILROAD EQUIPMENT

Using rule-based logic, the program narrowed down the choice to exponential smoothing or Box-Jenkins. The program performed an out-of-sample test to select between these two approaches. The cumulative MAD for Exponential smoothing was 1.27, and for Box-Jenkins was 1.21. The rolling out-of-sample test used a maximum horizon of 12 and generated 78 forecasts for each method. Based on the lower Mean Absolute Deviation, Box-Jenkins was selected.

#### Model Details

**Box-Jenkins**  
**ARIMA(1, 1, 0)**

Term	Coefficient	Std. Error	t-Statistic	Significance
a[1]	-0.271	0.1142	-2.372	0.9796

#### Within-Sample Statistics

Sample size	72	No. parameters	1
Mean	199.59	Std. deviation	4.04
R-square	0.94	Adj. R-square	0.94
Durbin-Watson	2.00	Ljung-Box(18)	10.70 P=0.09
Forecast error	1.03	BIC	1.05
MAPE	0.36	SMAPE	0.36
RMSE	1.02	MAD	0.73
MAD/Mean Ratio	0.00		

#### Actual Values for the Most Recent 6 Periods:

Date	Actual
2017-Nov	201.7
2017-Dec	201.6
2018-Jan	203.1
2018-Feb	201.9
2018-Mar	201.9
2018-Apr	202.0

#### Forecasted Values

Date	2.5 Lower	Forecast	97.5 Upper
2018-May	199.955	201.973	203.991
2018-Jun	199.483	201.980	204.477
2018-Jul	199.002	201.978	204.954
2018-Aug	198.610	201.979	205.348
2018-Sep	198.253	201.979	205.704
QTR AVG	198.622	201.979	205.335

## Interest Third Quarter 2018

The Interstate Commerce Commission, in its decision served February 28, 1989, revised the All-Inclusive Index methodology to include a specific interest component, which is to track changes in the average interest rate from year to year. The interest rate is essentially the embedded cost of debt, i.e., total interest expense divided by average total long term debt.

*The interest rate is calculated for the most recent year and used until the next year's figures are finalized.* The source data are from a summary of the annual reports (Form R-1) submitted by each of the Class I railroads. Although the data set is received at the end of March, it is not used until the September filing. This enables data to be entered into a database and reviewed – and any revisions made, if necessary, before the data are used in the Index. The current Interest Index is based on 2016 data, and was updated in the Q4 filing submitted on September 5, 2017. The Interest Index based on 2016 is at an all-time low. Although the index is based on embedded rates instead of entirely on current market conditions, it is no coincidence that rates for U.S. 20-year bonds were also at their lowest over the last 25 years.

The R-1 source for interest expense is Schedule 210, column b. The lines currently used are listed below. The source for average total debt is Schedule 200. The sums of data from columns b and c (ending and beginning balances) are combined and divided by 2 to compute an average balance. Line numbers listed below will have some differences from previous years because the Surface Transportation Board changed some of the line numbers and account definitions.

### Interest Expense (Schedule 210)

Line	
42	Total Fixed Charges
44	Contingent Interest
less	
22	Release of Premium on Funded Debt

### Average Total Debt (Schedule 200)

Line	
29	Current Liabilities, Loans and Notes Payable
38	Equipment Obligations and Other Long Term Debt Due Within One Year
40	Non-Current Liabilities: Funded Debt Unmatured
41	Non-Current Liabilities: Equipment Obligations
42	Non-Current Liabilities: Capitalized Lease Obligations
43	Non-Current Liabilities: Debt in Default
44	Non-Current Liabilities: Accounts Payable: Affiliated Companies
45	Non-Current Liabilities: Unamortized Debt Premium

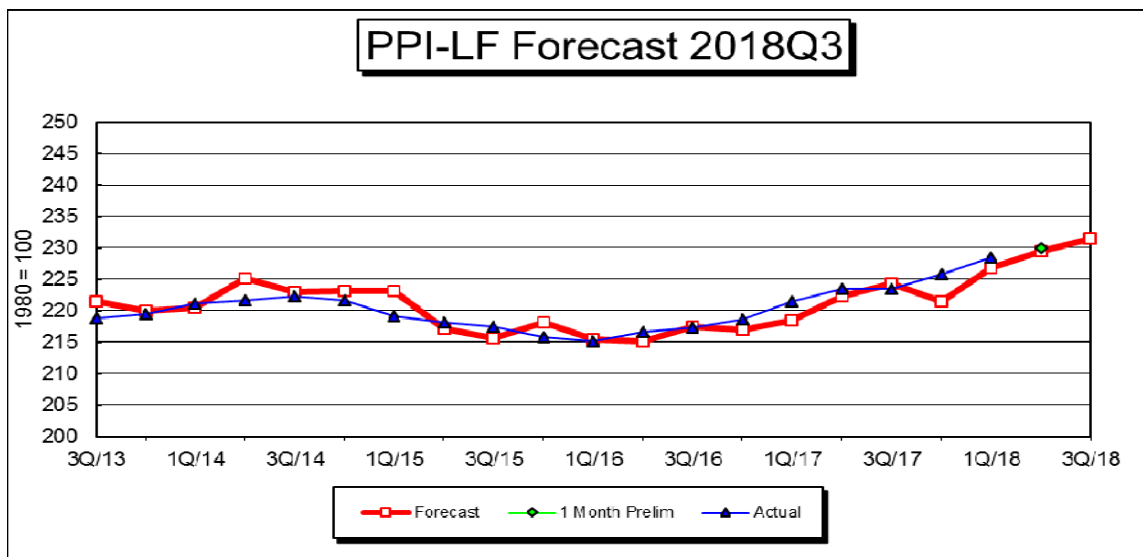
2016	Interest Rate	4.75%
1980	Interest Rate	7.85%
<b>2018Q3</b>	<b>Interest Index</b>	<b>60.5</b>
2018Q2	Interest Index	60.5
	Percent Change	0.0%

## Other Expenses Third Quarter 2018

The Producer Price Index for Industrial Commodities less Fuels and Related Products and Power (PPI-LF) is used to index purchased services, casualties and insurance, loss and damage, taxes (other than income and payroll), general and administrative expenses, and lease rentals. These expenses, when grouped together, are usually called "Other" expenses.

Like the PPI-RE, the PPI-LF is forecast using an ARIMA process on 6 years of monthly data (a sample size of 72) with the most recent available monthly data being the first month of the quarter prior to the forecast quarter. For a first quarter forecast, the most recent month of data available would be for October of the prior year. For a second quarter forecast, January would normally be the most recent month available. April and July would be the most recent months available for third and fourth quarter forecasts, respectively. The output from the forecast model is shown on page 2 of this appendix for 1982=100. Monthly PPI-LF figures have been increasing at an accelerating rate, and this is reflected in the forecast.

Forecast of Other Expense Index (1982=100)	206.5
Forecast of Other Expense Index (1980=100)	231.5
Change from previous quarter forecast	0.9%
Change from actual first month of previous quarter	0.7%
Change from same quarter of prior year (actual)	3.6%



## Other Expenses Third Quarter 2018

### PPI INDUSTRIAL COMMODITIES LESS FUELS AND RELATED PRODUCTS AND POWER

Using rule-based logic, the program narrowed down the choice to exponential smoothing or Box-Jenkins. An out-of-sample test was used to select between these two approaches. A rolling out-of-sample test used a maximum horizon of 12 and generated 78 forecasts for each method. The cumulative MAD for Exponential smoothing was 1.52 and for Box-Jenkins was 1.49. Based on the lower Mean Absolute Deviation, Box-Jenkins was selected.

#### Forecast Model for PPILF

Box-Jenkins  
ARIMA(1, 1, 0)

#### Model Details

Term	Coefficient	Std. Error	t-Statistic	Significance
a[1]	0.7105	0.0765	9.287	1

#### Within-Sample Statistics

Sample size	72	No. parameters	1
Mean	5.28	Std. deviation	0.02
R-square	0.98	Adj. R-square	0.98
Durbin-Watson	2.16	Ljung-Box(18)	20.7 P=0.71
Forecast error	0	BIC	0.43
MAPE	0.16	SMAPE	0.16
RMSE	0.41	MAD	0.32
MAD/Mean Ratio	0		

#### Actual Values for the Most Recent 6 Periods:

Date	Actual
2017-Nov	201.5
2017-Dec	201.7
2018-Jan	203.0
2018-Feb	203.8
2018-Mar	204.5
2018-Apr	205.2

#### Forecasted Values

Date	2.5 Lower	Forecast	97.5 Upper
2018-May	204.844	205.699	206.557
2018-Jun	204.361	206.054	207.761
2018-Jul	203.770	206.307	208.875
2018-Aug	203.134	206.486	209.894
2018-Sep	202.490	206.614	210.823
QTR AVG	203.131	206.469	209.864

## Railroad and Union Abbreviations

### Third Quarter 2018

#### ***Railroads***

BLE	Bessemer & Lake Erie Railroad (Part of CN's Grand Trunk Corp.)
BNSF	BNSF Railway Company
CC	Chicago, Central & Pacific (Part of CN's Grand Trunk Corp. Sometimes noted as CC&P.)
CN	Canadian National Railway (Commonly known as CN, owns Grand Trunk Corporation.)
CNGT	AAR's abbreviation for Grand Trunk Corporation (Almost all of CN's U.S. operations.)
CP	Canadian Pacific (Also noted as CPR. Owns the U.S. Class I railroad Soo Line.)
CPSL	AAR's abbreviation for Soo Line Corporation (CP's U.S. operations including SOO, D&H, and DME.)
CSX	CSX Transportation
D&H	Delaware & Hudson (Part of Canadian Pacific's U.S. operations, included beginning 2011Q4.)
DME	Dakota, Minnesota & Eastern (Part of Canadian Pacific's U.S. operations, included beginning 2011Q4.)
GTW	Grand Trunk Western Railroad (Part of CN's Grand Trunk Corp.)
IC	Illinois Central Railroad (Part of CN's Grand Trunk Corp.)
KCS	Kansas City Southern Railway
NS	Norfolk Southern Combined Railroad Subsidiaries (a.k.a. Norfolk Southern Railway or NS Rail)
SOO	Soo Line Railroad (The largest part of Canadian Pacific's U.S. operations.)
UP	Union Pacific Railroad
WC	Wisconsin Central and subsidiaries (Part of CN's Grand Trunk Corp.)

#### ***Major Unions Involved with Railroads***

ATDA	American Train Dispatchers Association
BLET	Brotherhood of Locomotive Engineers and Trainmen Div. of the International Brotherhood of Teamsters
BMWED	Brotherhood of Maintenance of Way Employees Division of the International Brotherhood of Teamsters
BRS	Brotherhood of Railroad Signalmen
IAM	International Association of Machinists and Aerospace Workers
IBBM	International Brotherhood of Boilermakers, Iron Ship Builders, Blacksmiths, Forgers & Helpers
IBEW	International Brotherhood of Electrical Workers
NCFO	National Conference of Firemen and Oilers
SMART-TD	International Association of Sheet Metal, Air, Rail, and Transportation Workers - Transportation Division*
SMART-MD	International Association of Sheet Metal, Air, Rail, and Transportation Workers - Mechanical Division**
TCU	Transportation Communication International Union
TCU-Carmen	Brotherhood of Railway Carmen Division of the Transportation Communications International Union

#### ***Predecessor Unions (Some AAR databases use these old abbreviations.)***

BLE	Brotherhood of Locomotive Engineers (predecessor to BLET)
BMWE	Brotherhood of Maintenance of Way Employees (predecessor to BMWED)
BRC	Brotherhood of Railway Carmen (predecessor to TCU-Carmen)
IBFO	International Brotherhood of Firemen and Oilers (predecessor to NCFO)
SMW	Sheet Metal Workers' International Association (see SMART-MD)
UTU	United Transportation Union (merged into SMART)
UTU-YMD	United Transportation Union Yardmaster Department (see SMART-TD)

\* Represents employees formerly represented by the UTU (conductors and brakemen) and also has a separate yardmasters department.

\*\* Represents employees formerly represented by the SMW (steel workers)