U.S. Multiemployer Pension Plan Pending Insolvencies

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Introduction and Executive Summary

More than 1,200 multiemployer pension plans in the United States cover about 10 million participants, including roughly 4 million retirees. While most multiemployer plans are financially stable, some have been identified under federal law as "Critical and Declining."[1] This study focuses on 115 such plans, excluding plans receiving Pension Benefit Guaranty Corporation (PBGC) financial assistance or that have received approval for benefit suspensions under the Kline-Miller Multiemployer Pension Reform Act of 2014. These 115 plans cover roughly 1.4 million participants—about 719,000 of them retired and receiving annual benefits totaling more than $7.4 billion. Approximately 11,600 employers contribute to these 115 plans.[2] Many of these plans are at risk of becoming insolvent within fewer than 10 years.

When a multiemployer pension plan fails, the PBGC provides financial assistance to the plan so that it can pay retirees' benefits up to a maximum level defined by federal law.[3] However, the PBGC projects that its multiemployer insurance program "is more likely than not to use up all of its assets by the end of fiscal year (FY) 2025."[4]

This study explores the impact of insolvency on these 115 Critical and Declining plans, their participants and contributing employers. The estimates result from publicly available plan-level information and a model developed by the authors, with the advice of several deeply experienced multiemployer actuaries. Here are highlights of the analysis:

- The following table shows a cumulative summary of plans projected to become insolvent over the next 20 years, assuming future annual investment returns of 6%. This assumption was developed from several recently published capital market outlook reports and surveys of various investment advisers, and therefore differs from the long-term expected rates of return typically used for minimum funding purposes.

PROJECTED INSOLVENT PLANS (CUMULATIVE)

By This Year	Total Plans	Total Contributing Employers	Total Participants	Total Annual Benefit Payments to Retirees[5]	Average Annual Benefit per Retiree[5]
2023	21	350	95,000	$427 million	$ 8,600
2028	50	2,700	545,000	$4.7 billion	$14,300
2033	91	5,100	920,000	$7.1 billion	$13,000
2038	107	11,350	875,000	$6.9 billion	$13,000

Estimated PBGC guarantees range from 20% to 90% of plan benefits.

[1] Internal Revenue Code §§431–32 and accompanying regulations govern funding requirements for multiemployer pension plans. The rules include definitions of status, including "Critical and Declining" status. Appendix 2: Plans Studied provides additional information on the criteria for plans included in this study.
[2] Appendix 2: Plans Studied provides more information about the plans examined.
[3] ERISA §§ 4022A and 4022B of the Employee Retirement Security Act of 1974 (ERISA) govern multiemployer benefit guarantees.
[4] Pension Benefit Guaranty Corporation, *FY 2016 PBGC Projections Report*, p. 1.
[5] Reflects estimated full plan benefits without regard to PBGC guarantees.

The authors project fewer than 115 insolvencies within 20 years primarily because investment returns in 2016 and, especially 2017, appear to have delayed insolvency slightly beyond 20 years for some plans. Projections that use more detailed plan-specific data may render somewhat different results, although the general outcomes would likely be similar.

- The estimated unfunded liability for 2018 of these 115 plans, as measured on a minimum funding basis, is $57 billion. When measured at 2.90%, it is $108 billion. The discount rate of 2.90% represents a liability-weighted average of Treasury rates in April 2018. When Treasury rates are used to discount only the plan's unreduced benefit obligations after the point of projected plan insolvency, and the minimum funding basis discount rate is used otherwise, these plans' total unfunded liability is $76 billion. Note that these liabilities reflect full plan benefits without regard to PBGC guarantee limits.
- The timing of solvency can be sensitive to investment returns. In general, plans that are closer to insolvency are less sensitive to investment returns than plans that have more time for investment returns to compound, either in their favor or against it. Even with extraordinarily optimistic investment returns of 10% per year for 20 years, 68 of the 115 plans would be projected to become insolvent within 20 years.
- Optimistic investment returns have limited impact on insolvency among these plans primarily because their net cash flow positions tend to be severely negative. In 2018, 81 of the plans have annual negative net cash flow that is 10% or more of their assets. In other words, unless these plans' assets earn at least 10% per year, the assets will decline. Twenty-seven (27) of the plans have negative net cash flow that is 20% or more of their assets.
- Pending insolvencies are largely a function of existing liabilities for benefits that have already been accrued. While freezing or reducing benefit accruals would limit the growth of new unfunded liabilities, it would have little effect on the timing of insolvency among these plans over the next 10 years. However, when there are fewer active employees on whose behalf contributions are made, contributions may fall, hence hastening insolvency.

Funded Status and Liabilities

Although the definition of Critical and Declining is complex, the actuary of such a plan must certify that the plan is projected to be insolvent within 15 or 20 years. When a multiemployer pension plan becomes insolvent, the PBGC provides financial assistance to the plan so that it can pay retirees' benefits up to a maximum level that is defined by federal law.[6] Technically, PBGC financial assistance is in the form of a loan to the plan. However, if a plan is unable to recover, the PBGC essentially assumes responsibility for the guaranteed benefit payments. The PBGC believes its multiemployer fund will exhaust its assets by the end of fiscal year 2025.[7]

Multiemployer plan funded status is typically reported using liabilities computed with a discount rate that reflects the long-term expected return on plan assets. This is the approach used for multiemployer plan minimum funding requirements under federal law.[8] Because the PBGC is an agency of the federal government, and Treasury interest rates best represent the cost of money to the federal government, some readers may be interested in liabilities that use Treasury rates to discount the benefit payments due to participants post-insolvency, while benefits due prior to insolvency are discounted with the long-term expected rate of return on assets. In addition, some readers may be interested in pension liabilities that are fully discounted using Treasury rates.

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[6] ERISA §§ 4022A and 4022B of the Employee Retirement Income Security Act (ERISA) govern PBGC involvement with failing multiemployer pens ion plans.
[7] Pension Benefit Guaranty Corporation, *FY 2016 PBGC Projections Report*, p. 1.
[8] IRC §§ 431–432 and accompanying regulations govern funding requirements for multiemployer pension plans.

Refer to Figure 1 for the aggregate funded status of the 115 Critical and Declining Plans under each approach. All liabilities and funded statuses presented in this study reflect full plan benefits without regard to PBGC guarantees, including liabilities related to post-insolvency benefit payments and, therefore, are not representative of liabilities to the PBGC.

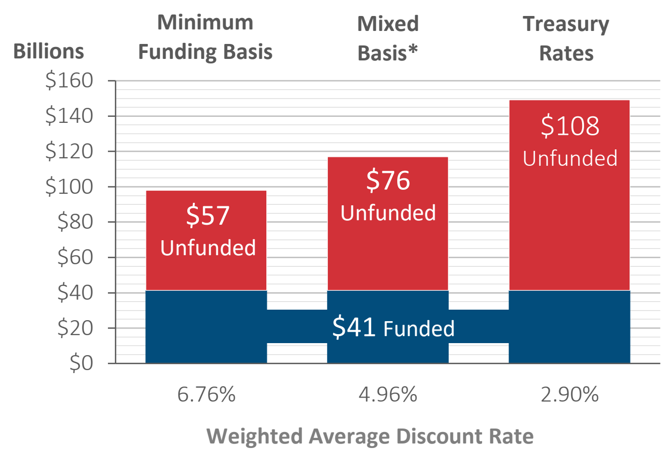
The authors estimate that the 115 Critical and Declining plans' 2018 liabilities total approximately $98 billion using the minimum funding requirements' approach. About $57 billion of that was not funded, for an overall funded ratio of 42%. The liability-weighted average discount rate on this basis is 6.76%.

When liabilities are discounted using the long-term expected return on assets for benefits due prior to insolvency and then Treasury rates for benefits due post-insolvency (the mixed basis approach), liabilities total about $117 billion. With an unfunded liability of approximately $76 billion, about 35% of the liability is funded.

When estimated at 2.90%, representing weighted average Treasury rates for April 2018, liabilities totaled approximately $149 billion, with an unfunded liability of about $108 billion and an overall funded ratio of 28%.

Figure 1

115 CRITICAL AND DECLINING PLANS: ESTIMATED 2018 LIABILITIES AND FUNDED STATUS



Note: all liabilities reflect full plan benefits without regard to PBGC guarantees, and therefore, are not representative of liabilities to the PBGC.

* Benefits are discounted using the minimum funding discount rate up to the year of projected insolvency assuming assets earn the same rate. Benefits thereafeter are discounted using 2.9%, representing Treasury rates.

Projected Insolvencies

This section of this study illustrates the authors' projection of Critical and Declining plan insolvencies over the next 20 years. These projections assume that after 2017, the plans' assets earn 6% annually. This assumption is loosely based on various investment advisers' recently published reports on their outlook for capital market assumptions, along with the *Survey of Capital Market Assumptions: 2017 Edition* published by Horizon Actuarial Services, LLC, and an asset allocation of 60% equities and 40% fixed income. Some readers may prefer a different assumed future rate of return, and the timing of insolvency can be sensitive to investment returns. Consequently, sensitivity to investment returns is explored in the Sensitivity to Investment Returns section of this study.

The projections also assume historical asset returns for all plans of 8% for 2016 and 14% for 2017. The authors developed these historical return assumptions from an average of actual returns for various common benchmarks and an asset allocation of 60% equities and 40% fixed income. The numbers were then rounded to a whole percentage to avoid the appearance of precision.

An asset allocation of 60% equities and 40% fixed income is generally representative of multiemployer plans as a whole, but individual plan asset allocations may vary. Asset mix variations combined with the impact of cash flow timing on investment return could produce different investment results for individual plans. While results for individual plans could vary, the authors believe that the trends and overall conclusions presented in this study are generally representative of these 115 plans as a group.

The aforementioned assumptions for actual investment earnings for 2016 and 2017 were higher than plan actuaries had assumed in their solvency projections. The gains, especially for 2017, appear to have delayed insolvency for a few years for some plans. The authors' projections show all 115 plans becoming insolvent, but only 107 plans do so within 20 years.

Figure 2 shows the cumulative number of plans projected to be insolvent by the start of each year over the next 20 years. Projections assume that once a plan becomes insolvent, it will remain insolvent. Figure 3 shows the number of participants in the insolvent plans, and Figure 4 shows the number of employers contributing to insolvent plans.

The projections show a steady increase in the number of insolvent plans. By 2028, 50 plans are projected to become insolvent, increasing to 91 by 2033 and 107 by 2038.

The 21 plans projected to become insolvent by 2023 are projected to cover approximately 95,000 participants at that time and include about 350 contributing employers. The 50 plans projected to become insolvent by 2028 are projected to cover roughly 545,000 participants with about 2,700 contributing employers.

Figure 2

CUMULATIVE NUMBER OF INSOLVENT PLANS

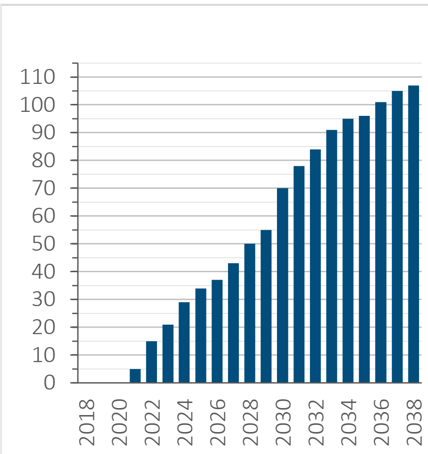


Figure 3

CUMULATIVE NUMBER OF PARTICIPANTS IN INSOLVENT PLANS

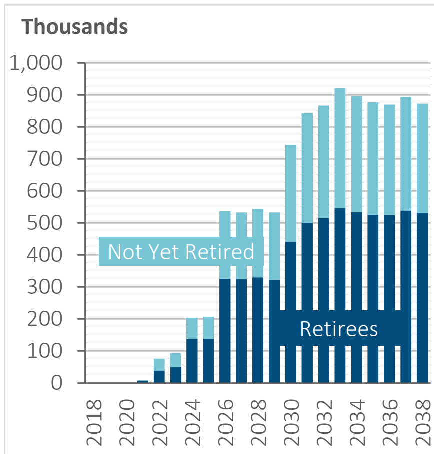
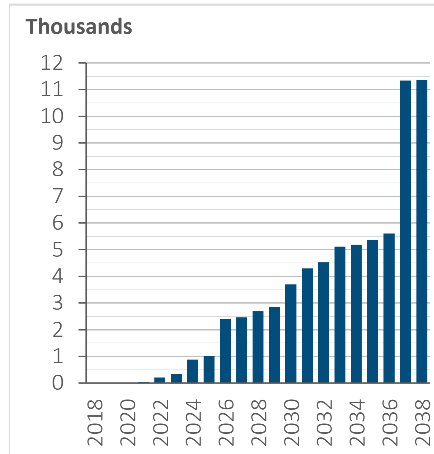


Figure 4

CUMULATIVE NUMBER OF EMPLOYERS IN INSOLVENT PLANS



Note: Figure 2 through Figure 4 assume 6% annual investment returns. Subsequent graphs show results for different investment returns.

The number of participants in insolvent plans (Figure 3) and the number of employer contributing to insolvent plans (Figure 4) both show a significant increase in 2026, largely because one very large plan is projected to become insolvent during 2025. For this study, the authors assume the number of employers contributing to each plan remains constant after the most recently available data. Figure 4 is the only element of this study directly affected by the number of contributing employers.

The number of participants in insolvent plans also shows a significant increase in 2030 because a number of rather large plans are projected to become insolvent during 2029. Although those plans cover many participants, they do not involve especially large numbers of contributing employers.

The 91 plans projected to become insolvent by 2033 are projected to cover approximately 920,000 participants and about 5,100 contributing employers. By 2038, 107 plans are projected to have become insolvent, covering roughly 875,000 participants and approximately 11,350 contributing employers. Note that a fairly small number of plans are projected to become insolvent during 2036, but one of those plans has an especially large number of contributing employers, which appears as a significant increase in 2037 of Figure 4.

Even though the number of insolvent plans increases over time, the number of participants in insolvent plans (Figure 3) declines after 2032 primarily because deaths among the aging participant populations generally outpace the number of new employees, if any, among the ongoing plans.

Additionally, it is worth noting that whether benefit accruals are frozen or plans are closed to new entrants or new benefit accruals is of little consequence to either the timing or financial impact of insolvencies among these plans over the next 10 years. Of course, additional benefit accruals, whether for existing active participants or newly hired employees, will increase plan liabilities, and freezing or reducing accruals would limit the liabilities' growth. However, pending insolvencies are largely a function of existing liabilities for benefits already accrued, especially benefits already in receipt. Additional liabilities for benefits that, for the most part, will not be paid until many years in the future have little effect on the timing of insolvencies pending in the meantime. Furthermore, closing the plan to new entrants and freezing accruals would deny the plan future contributions associated with active participants, which could outweigh the value of their future benefit accruals.

Nearly all 115 of these plans' actuaries have certified that, based on data at the start of 2015 or 2016 plan years, the plans are projected to become insolvent within 20 years. The authors' projections show fewer plans becoming insolvent within 20 years for the following reasons.

1. Status certifications through 2017 reflect data at the start of the 2015 or 2016 plan years.
2. As previously noted, the authors have assumed that all plans earned investment returns of 8% for 2016 and 14% for 2017. Returns for both of these years were higher than the assumed returns that were chosen and used in solvency projections by plan actuaries in advance of those years.
3. The authors' calculations use the most recent publicly available actual solvency projection data from 2015 or 2016 for only 25 of the 115 plans. All other plans are modeled using stylized, projected cash flows that have been fitted and scaled to each plan's liability.

Updated solvency projections performed for specific plans using detailed plan-specific data may produce different results, but the general trend among the group of plans would likely be similar.

Impact on Retirees

Retirees tend to experience insolvency more directly and more quickly than other participants because, to the extent that their pension benefits exceed the amount guaranteed by the PBGC, their benefits are reduced. Figure 5 shows the total annual benefits of insolvent plans, while Figure 6 shows the average pension benefit per retiree among insolvent plans. Both graphs reflect full estimated plan benefits without regard to PBGC guarantees. As in Figure 3 and Figure 4, the figures jump in 2026 primarily because a very large plan is projected to become insolvent in 2025.

As previously noted, by 2023, 21 plans are projected to be insolvent with about 50,000 retirees receiving a total of roughly $427 million in pension benefits of each year (Figure 5). On average, that is about $8,650 per retiree (Figure 6).[9] By 2028, 50 plans are projected to have become insolvent, with roughly 330,000 retirees receiving annual pension benefits totaling approximately $4.7 billion—on average about $14,325 per retiree.

By 2038, 107 plans are projected to become insolvent, covering approximately 530,000 retirees receiving annual pension benefits of about $6.9 billion, without regard to PBGC guarantees. The average plan benefit of affected retirees is roughly $13,000.

[9] Because of rounding, total benefits divided by number of retirees may not result in average benefit amounts shown.

Figure 5

TOTAL ANNUAL RETIREE BENEFITS OF INSOLVENT PLANS WITHOUT REGARD TO PBGC GUARANTEES

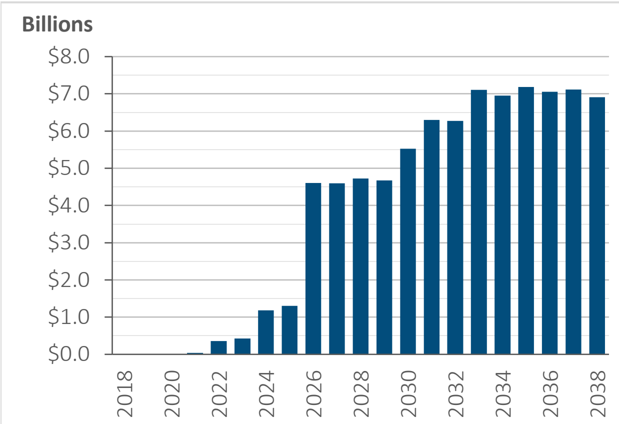
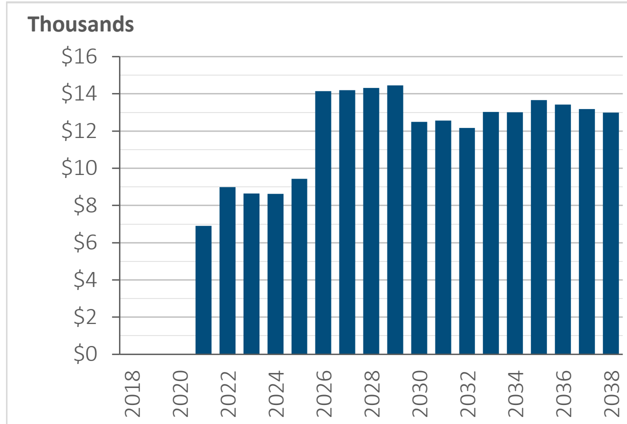


Figure 6

AVERAGE ANNUAL RETIREE BENEFIT OF INSOLVENT PLANS WITHOUT REGARD TO PBGC GUARANTEES



Note: Figure 5 and Figure 6 assume 6% annual investment returns. Subsequent graphs show results for different investment returns.

A portion of retirees' benefits are expected to be guaranteed by the PBGC. The formula for determining PBGC's guarantee for multiemployer plans is complex and depends on a participant's years of service, the plan's benefit formula, the date the benefit formula became part of the plan and the type of benefit. Therefore, both benefit amounts and the guaranteed portion vary by plan and participant.[10]

Further, the guaranteed monthly benefit is limited to $35.75 per year of service in the plan. Therefore, the maximum guaranteed benefit for a retiree with 30 years of service in a plan is $12,870 per year. For a retiree with 20 years of service in a plan, the maximum guaranteed benefit is $8,580 per year.

While some retirees worked for 30 or more years covered under a single plan, many retirees' working years spanned multiple jobs that were covered by different plans. The average of retirees' benefits in this study reflect retirees of all service levels.

Estimated PBGC guarantees range from 20% to 90% of plan benefits.

The plan-level data used in this study does not reflect the details required to compute guaranteed benefits. The authors used multiple techniques to estimate PBGC-guaranteed benefits by plan. Techniques included estimating service for existing retirees as well as estimating service and benefit levels of future retirees. The results ranged from less than 20% to more than 90% of plan benefits. In general, plans with smaller benefit amounts tend to have higher guaranteed percentages than plans with larger benefit amounts.

Sensitivity to Investment Returns

Investment returns on plan assets can affect the timing of insolvency. This section illustrates the sensitivity of investment returns on insolvency of the plans studied. The illustrations compare projected insolvencies in the case of 6% annual investment returns, as previously shown, to constant annual returns of 4%, 8% and 10% each year. In addition, to illustrate

[10] ERISA §§4022A and 4022B govern multiemployer pension benefit guarantees.

the effect of a short-term shock to investments, results are also shown assuming 0% returns for 2 years followed by 6% constant returns thereafter.

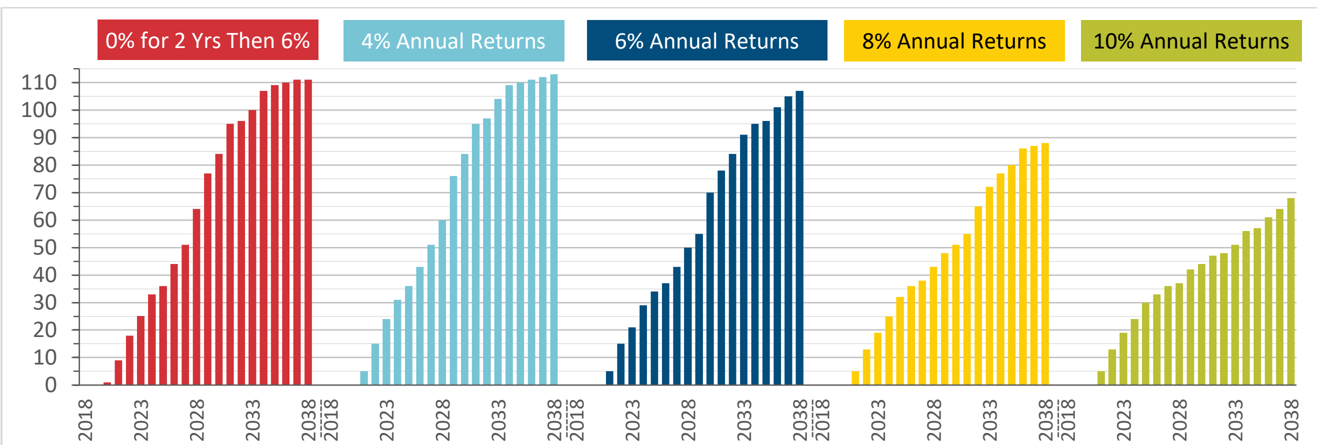
In general, investment returns have more significant impact on timing of insolvency for plans projected to become insolvent after 2023. For plans projected to become insolvent before 2023, assets are generally too small to produce enough investment income to significantly limit their net cash outflow. While the amount of investment income does affect the timing of these plans' insolvency to some degree, it is more likely measured in months rather than years.

For plans generally projected to become insolvent after 2023, investment returns can heavily influence the timing of insolvency, especially for plans projected to become insolvent well after 2023. In general, these plans currently have enough assets that if investment returns are better than assumed rates, they can generate enough investment income to partially offset their negative cash flows—perhaps even significantly—thereby delaying insolvency by a number of years. However, the opposite is also true; poorer investment returns can significantly hasten insolvency for these plans.

Even with exceptional investment returns of 10% per year for the next 20 years, 68 plans—over half of the Critical and Declining plans—are still projected to become insolvent by 2038 (Figure 7), affecting approximately 3,400 employers (Figure 9) . Those 68 plans are projected to cover roughly 875,000 participants by that point, including about 530,000 retirees (Figure 8). With total annual benefits of approximately $6.9 billion (Figure 10), the average annual benefit among the insolvent plans is about $14,500 per retiree (Figure 11).[11]

Figure 7

CUMULATIVE NUMBER OF INSOLVENT PLANS



At the other extreme of constant returns in these illustrations, if investment returns were constantly 4% each year, 113 of the 115 plans would be expected to become insolvent by 2038. Covering approximately 895,000 participants, the plans would be paying total annual pension benefits of about $7.0 billion to about 545,000 retirees, for an average annual benefit of about $12,800.[11]

The sensitivity analysis also illustrates the impact of 2 years of no (0%) asset returns followed by constant 6% returns. The overall results are roughly the same as the scenario of constant 4% investment returns. Short-term unfavorable market conditions can have detrimental effects on these plans because they have relatively small asset bases compared to immediate benefit payments. Even a fairly limited blow to the assets can hasten insolvency.

[11] Estimated benefits reflect full plan benefits without regard to PBGC guarantees.

Figure 8

CUMULATIVE NUMBER OF PARTICIPANTS IN INSOLVENT PLANS

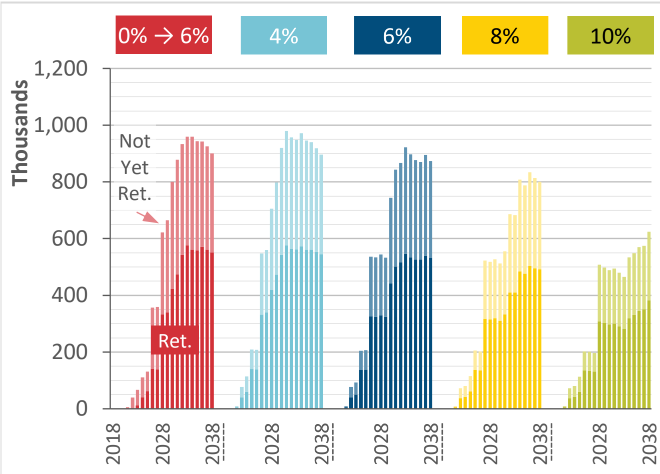


Figure 9

CUMULATIVE NUMBER OF EMPLOYERS CONTRIBUTING TO INSOLVENT PLANS

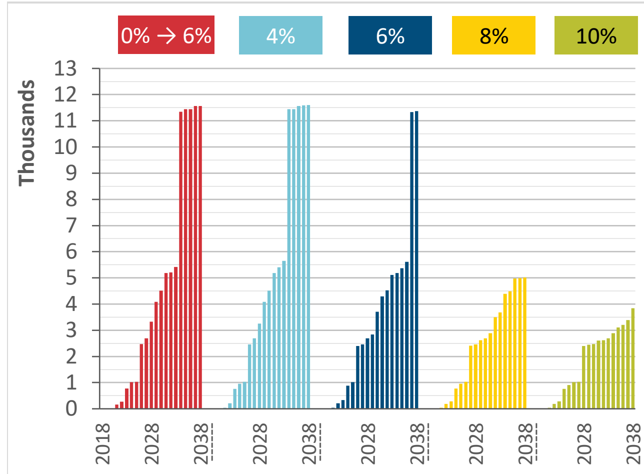


Figure 10

ANNUAL RETIREE BENEFITS OF INSOLVENT PLANS

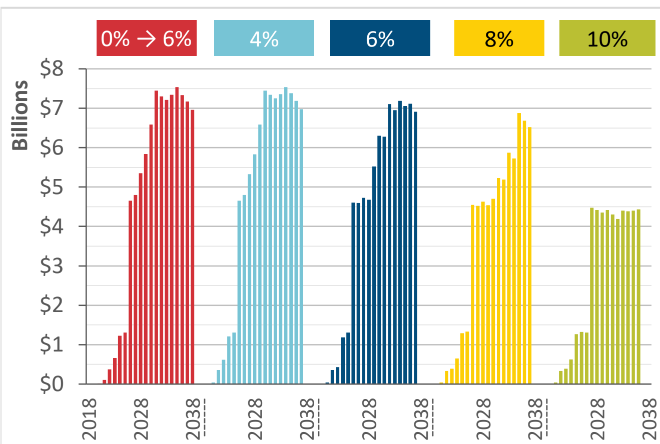
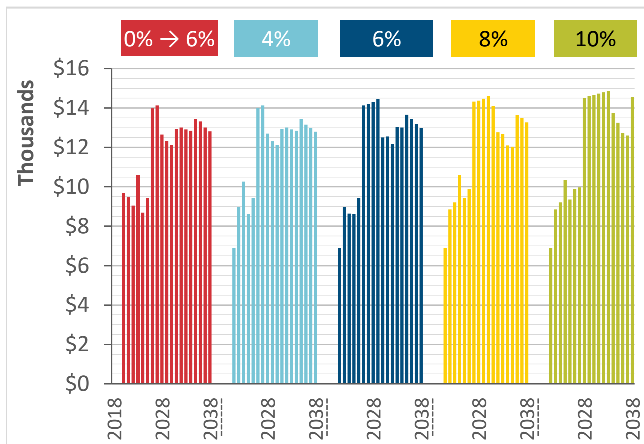


Figure 11

AVERAGE ANNUAL RETIREE BENEFITS OF INSOLVENT PLANS



The earlier that a plan experiences higher investment returns—or any source of additional income—the longer it would be expected to able to fulfill its benefit obligations. Subsequent poorer returns of the same magnitude but in a later year would offset some of the insolvency delays, but the later negative impact would generally be smaller than the earlier positive impact because the poorer returns would generally be on a smaller asset base.

Similarly, an early year of poorer investment returns would typically not be fully offset by a subsequent year with the same percent richer return.

Negative Cash Flow and Burn Rate

All of the plans included in this study have more benefit payments and expenses paid out of the plan than contributions and withdrawal liability payments coming into the plan. That is, all of the plans are in negative cash flow positions.

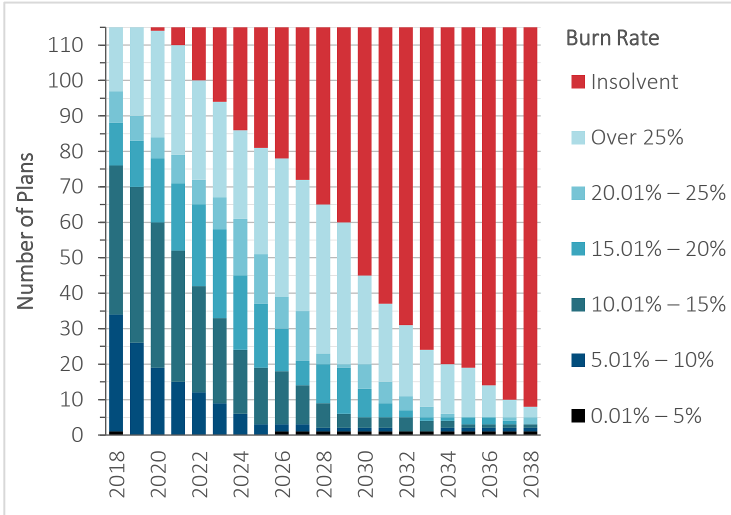
One metric of negative cash flow that allows comparison across plans of different sizes is the ratio of net cash flow to the market value of assets, commonly known as the burn rate.[12] Because the burn rate concept applies only in negative cash flow situations, the negative sign is typically ignored or dropped.

The burn rate tells the observer the rate at which assets decrease in the absence of investment returns. Another way to think of the burn rate is the rate of return on assets required to hold assets flat. For example, a plan has negative net cash flow that is 10% of its market value of assets. In other words, the plan has a 10% burn rate. If the plan's assets were cash stuffed in a mattress, next year there would be 10% less cash in the mattress. If the assets were invested, instead of stuffed in a mattress, the investments would need to return 10% to have the same amount of assets at the end of the year as the plan had at the beginning of the year.

Refer to Figure 12 for the number of plans at various burn rates. The authors estimate that in 2018, 81 of the 115 plans (70%) have burn rates over 10%, and 27 of the 81 plans (23%) have burn rates over 20%. Consequently, it is little surprise the sensitivity analysis showed that even with 10% annual investment returns for the next 20 years, over half of these 115 plans are still projected to become insolvent.

In general, as pension plans head toward insolvency, they tend to enter negative cash flow spirals. As assets decline, the burn rate grows, which means that assets decline faster. Once a plan starts down a negative cash flow spiral, the plan needs larger and larger infusions of cash to reverse the path to insolvency and recover financially.

Figure 12
BURN RATE DISTRIBUTION AMONG 115 PLANS



Data and Methods

Analysis for this study is modeled from publicly available plan-level data from the Department of Labor database of Form 5500 "Annual Return/Report of Employee Benefit Plan" filings as of Feb. 8, 2018, supplemented with information gathered from attachments to selected plans' Forms 5500, from applications for benefit suspension posted on the Department of Treasury website and from zone status notices posted on the Department of Labor website.[13]

This study excludes plans that received final approval for benefit suspensions under the Kline-Miller Multiemployer Pension Reform Act of 2014 as well as plans that are receiving financial assistance from the PBGC. The plans included in the study and those for which supplemental data was used are identified in Appendix 2: Plans Studied.

[12] Net cash flow refers to the sum of contributions and withdrawal liability payments less benefit payments and expenses.
[13] Applications for benefit suspension under the Kline-Miller Multiemployer Pension Reform Act of 2014 are available at *https://www.treasury.gov/services/Pages/Plan-Applications.aspx*. Zone status notices are available at *https://www.dol.gov/agencies/ebsa/about-ebsa/our-activities/public-disclosure/critical-status-notices*.

Other than exclusions or adjustments for obvious errors, data were used as reported. The use of the reported values is not intended to provide commentary on the appropriateness of the underlying assumptions and methods for funding these plans or for any other purpose.

Note the following items about the data:

- The most recent year of complete reporting is for plan years beginning in 2015. In addition, data reflect 2016 reporting for nearly two-thirds of the 115 plans included in the study.
- Many participants have earned benefits under more than one multiemployer plan, and many employers contribute to more than one of these plans. This study reflects the sum of reported counts for each plan.

The authors' calculations use the most recent publicly available actual solvency projection data from 2015 or 2016 for only 25 of the 115 plans, as identified in Appendix 2: Plans Studied. All other plans are modeled using stylized, projected cash flows that have been shaped and scaled to fit each plan's liability as reported on the most recent publicly available Form 5500 Schedule MB for 2015 or 2016. Demographic assumptions for mortality, retirement, termination, etc. are built into the cash flows. Other demographic assumptions are outlined in Appendix 1: Assumptions.

The techniques and assumptions used in this study were developed for this group of 115 multiemployer plans as a whole and may not be appropriate for any given plan or smaller set of plans. Modifications to the assumptions and methods used may result in different numerical outcomes, but the overall conclusions are likely to be similar. Appendix 1: Assumptions lists the key assumptions used in this analysis, and Appendix 2: Plans Studied shows the plans included in this study.

Acknowledgments

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Appendix 1: Assumptions

Reported assets, liabilities and related data from Form 5500 Schedule MB were used when available. In addition, for selected plans, as indicated in Appendix 2, the study uses benefit payments, expenses, contributions and withdrawal liability payments from solvency projections prepared by the plan actuary and attached to Form 5500 Schedule MB or applications for benefit suspensions under the Kline-Miller Multiemployer Pension Reform Act of 2014. Otherwise, the assumptions used in this study are outlined below.

Discount Rates[14]	
Treasury rates	2.90%
Minimum funding liabilities	6.76%
Increases in Benefit Per Year of Service	0%
Demographics of New Retirees	
Males with single life annuity	45%
Males with 50% joint and survivor annuity	45%
Females with single life annuity	5%
Females with 50% joint and survivor annuity	5%
Total	100%
Future Asset Returns in Solvency Projections	
Baseline	6% annually[15]
Sensitivity Analysis	4%, 8% and 10% annually; 0% for 2 years followed by 6% annually

Assumptions that Vary by Year:

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025+
Change in Number of Active Ppts[16]	−0.9%	−4.0%	−2.4%	−2.4%	−2.0%	−1.9%	−1.7%	−1.7%	−1.7%	−1.7%	−1.6%
Contribution Change per Active Ppt	1.6%	1.6%	1.6%	2.1%	2.8%	3.0%	2.6%	4.1%	4.2%	3.1%	3.0%
Historical Investment Return[17]	1%	8%	14%	--	--	--	--	--	--	--	--

The techniques and assumptions used in this study were developed for the studied group of multiemployer plans as a whole and may not be appropriate for any given plan or smaller set of plans. Modifications to the assumptions and methods used may result in different numerical outcomes, but the overall conclusions are likely to be similar.

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[14] Liability-weighted average discount rates

[15] Future investment return assumptions are loosely based on a diversified asset allocation of 60% equities and 40% fixed income and a composite of capital market outlook reports published by various investment advisors within the past year along with Survey of Capital Market Assumptions: 2017 Edition, conducted and published by Horizon Actuarial Services, LLC, in August 2017. This assumption is neither intended to represent nor should be interpreted as a prediction of capital market returns.

[16] These assumptions were developed from a combination of information gleaned from attachments to Form 5500 Schedule MB for the indicated plans, including solvency projections assumptions and age-service grids.

[17] Historical investment return assumptions were developed using various common index returns and an asset allocation of 60% equities and 40% fixed income, and then rounded to a whole percentage to avoid the appearance of precision.

Appendix 2: Plans Studied

The plans included in this study that have been certified as Critical and Declining under federal law, as identified by one or more of the following methods:[18]

- Form 5500 filings for 2015 or 2016, as of Feb. 8, 2018, or
- Critical and Declining Status Notice as posted on the Department of Labor website.[19]

From the Critical and Declining plans, the following plans have been excluded for the following reasons:

- Four plans have received approval for benefit suspensions under the Kline-Miller Multiemployer Pension Reform Act of 2014.
- Six plans have begun receiving financial assistance from the PBGC.

In addition, this study includes a very small number of larger plans that are likely to become Critical and Declining soon. The plans listed below were included in this study. The third column indicates plans for which this study used benefit payments, expenses, contributions and withdrawal liability payments and related information from solvency projections prepared by the plan actuary and attached to Form 5500 Schedule MB or applications for benefit suspensions under the Kline-Miller Multiemployer Pension Reform Act of 2014. In addition, for the largest plans, the age-service grids attached to Schedule MB were used to develop some of the demographic assumptions.

EIN	PN	Supplemental Data Used	Plan Name
042316465	001		ROOFERS AND SLATERS LOCAL NO. 248 PENSION PLAN
046372430	001	X	NEW ENGLAND TEAMSTERS & TRUCKING INDUSTRY PENSION
116027518	001		LOCAL 810 AFFILIATED PENSION PLAN
116045281	001		LOCAL 365 UAW PENSION FUND
116166763	001	X	PACE INDUSTRY UNION-MANAGEMENT PENSION FUND
116170655	001		LOCAL 138 PENSION TRUST FUND
131798229	001	X	PENSION FUND OF AMALGAMATED INDUSTRIAL AND TOY & NOVELTY WORKERS OF AMERICA LOCAL 223
131917612	001		LOCAL 805 PENSION & RETIREMENT FUND
131976397	001		PRODUCTION WORKERS PENSION FUND
132562528	001		LOCAL 210S PENSION PLAN
132640882	001		LOCAL 966 PENSION PLAN
132864446	001		LOCAL 305 CIO PENSION FUND
136086163	001		MANAGEMENT-LABOR PENSION FUND LOCAL 1730 ILA
136086164	001		LOCAL 917 PENSION FUND
136104795	001		PAPER HANDLERS-PUBLISHERS PENSION FUND
136152896	001		PRESSROOM UNIONS PENSION TRUST FUND
136159229	001		RADIO TELEVISION AND RECORDING ARTS PENSION PLAN
136212879	001	X	CWA/ITU NEGOTIATED PENSION PLAN
136367793	001		LOCAL 888 PENSION FUND
136415392	001		GRAPHIC COMMUNICATIONS INTL UNION LOCAL 119B NY PRINTERS LEAGUE PENSION FUND
136596940	001		UNITED WIRE, METAL & MACHINE PENSION FUND

[18] IRC §§ 431–32 and accompanying regulations govern funding requirements for multiemployer pension plans. The rules include the definition of Critical and Declining status.
[19] Zone status notices are available at *https://www.dol.gov/agencies/ebsa/about-ebsa/our-activities/public-disclosure/critical-status-notices*.

EIN	PN	Supplemental Data Used	Plan Name
136613842	001	X	PENSION FUND OF MOVING PICTURE MACHINE OPERATORS UNION OF GREATER NEW YORK LOCAL 306
136613876	001		PENSION FUND FOR IRON WORKERS LOCAL 455
136626195	001		BAKERY DRIVERS AND SALESMEN LOCAL 550 AND INDUSTRY PENSION FUND
146016608	001		BAC LOCAL 5 NEW YORK PENSION PLAN
146032279	001		IBEW EASTERN STATES PENSION PLAN
146048883	001		LABORERS UNION PENSION FUND LOCAL NO 186
166094914	001		IBEW LOCAL UNION NO 237 PENSION PLAN
203856052	001		TEAMSTERS LOCAL 210 AFFILIATED PENSION TRUST FUND
221598194	001	X	LOCAL NO. 863 PENSION PLAN
223122225	001		NEW BEDFORD FISHERMENS PENSION FUND
226063702	001	X	TRUCKING EMPLOYEES OF NORTH JERSEY WELFARE FUND INC-PENSION FUND
226172237	001		TEAMSTERS LOCAL 469 PENSION PLAN
226172437	001		TEAMSTERS LOCAL 408 PENSION PLAN
226174132	002		LOCAL 734 PENSION FUND
226190618	001	X	NATIONAL INTEGRATED GROUP PENSION PLAN
226196388	001		TEAMSTERS EMPLOYERS LOCAL 945 PENSION FUND
226196988	001		U.T.W.A. N.J. UNION EMPLOYER PENSION PLAN
226220288	001	X	TEAMSTERS LOCAL 641 PENSION FUND
226250252	001	X	IUE-CWA PENSION PLAN
226255484	001		BAKERY DRIVERS & SALESMEN LOCAL 194 & INDUSTRY PENSION FUND
226298155	001		COMMUNICATIONS WORKERS LOCAL 1109 PENSION FUND
232009068	001		LOCAL UNION 1158 I.B.E.W. PENSION FUND - PA
236209656	001	X	UNITED FOOD AND COMMERCIAL WORKERS UNION LOCAL 152 RETAIL MEAT PENSION PLAN
236209755	001		BINDERY INDUSTRY EMPLOYERS GCCIBT PENSION PLAN
236230368	001		WHSE EMPLOYEES UNION LOCAL 169 AND EMPLOYERS JOINT PENSION FUND
236396097	001	X	UFCW UNION & PARTICIPATING FOOD INDUSTRY EMPLOYERS TRI-STATE PENSION FUND
236405043	001		UNITED INDEPENDENT UNION-NEWSPAPER GUILD OF GREATER PHILADELPHIA PENSION FUND
236445411	001		PLASTERERS AND CEMENT MASONS LOCAL 94 PENSION FUND
236527213	001		LOCAL 837 PENSION PLAN
237356773	001		TEAMSTERS LOCAL 617 PENSION FUND
251046087	001		SOUTHWESTERN PENNSYLVANIA & WESTERN MARYLAND AREA TEAMSTERS & EMPLOYERS PENSION FUND
256029946	001	X	WESTERN PENNSYLVANIA TEAMSTERS AND EMPLOYERS PENSION PLAN
316126985	001		BRICKLAYERS LOCAL 55 PENSION PLAN
316127282	001		LABORERS LOCAL 265 PENSION PLAN
316127285	001		COMPOSITION ROOFERS LOCAL 42 PENSION PLAN
316127287	001	X	SW OH REGIONAL COUNCIL OF CARPENTERS-PENSION PLAN
316131266	001		ASBESTOS WORKERS LOCAL 8 RETIREMENT TRUST FUND
346665225	001		BUILDING MATERIAL DRIVERS LOCAL 436 PENSION FD
346666753	001		SHEET METAL WORKERS LOCAL PENSION PLAN
346666798	001		BRICKLAYERS ALLIED CRAFTSMEN LOCAL 7 PENSION
362427068	001		THE PENSION TRUST ESTATE FOR SHOPMENS LOCAL UNION NO. 473
366019539	001		CHICAGO NEWSPAPER PUBLISHERS DRIVERS UNION PENSION TRUST
366044243	001	X	CENTRAL STATES, SOUTHEAST & SOUTHWEST AREAS PENSION PLAN
366508328	001		UNITED FOOD AND COMMERCIAL WORKERS UNIONS & EMPLOYERS MIDWEST PENSION FUND
366598153	001		CTDU - PENSION FUND
376117130	001		MIDWESTERN TEAMSTERS PENSION TRUST FUND
376155648	001		LOCAL 171 PENSION PLAN

EIN	PN	Supplemental Data Used	Plan Name
382131072	001		RETIREMENT BENEFIT PLAN OF GCIU DETROIT NEWSPAPER UNION 13N WITH DETROIT AREA NEWSPAPER PUBLISHERS
386233975	001		IRONWORKERS 340 RETIREMENT PLAN
386242188	001		CARPENTERS PENSION TRUST FUND DETROIT AND VICINITY
396069053	001		UFCW (Milwaukee HQ)
436049855	001		UFCW DISTRICT UNION LOCAL TWO AND EMPLOYERS PENSION FUND
510149915	001	X	TEAMSTERS LOCAL UNION NO 73 PENSION PLAN
516040136	001		LOCAL 734 PENSION FUND
516097308	001		LOCAL 1814 RIGGERS PENSION FUND
516098763	001		TEAMSTERS UNION LOCAL NO 52 PENSION FUND
516099111	002		LOCAL 807 LABOR MANAGEMENT PENSION FUND
516112573	001		BAKERY DRIVERS LOCAL 802 PENSION FUND
516120204	001		AMERICAN FEDERATION OF MUSICIANS AND EMPLOYERS PENSION FUND AND SUBSIDIARY
516123679	001		LOCAL 584 PENSION TRUST FUND
516128660	001		LOCAL 1922 PENSION FUND
521050282	002	X	UNITED MINE WORKERS OF AMERICA 1974 PENSION PLAN
521074215	001	X	GRAPHICS ARTS INDUSTRY JOINT PENSION TRUST
526033899	001		PRINTING LOCAL 72 INDUSTRY PENSION PLAN
526067609	001		IRONWORKERSLABORERS PENSION PLAN OF CUMBERLAND MD
526118055	001		FREIGHT DRIVERS AND HELPERS LOCAL UNION NO 557 PENSION PLAN
526118568	001	X	GRAPHIC COMMUNICATIONS CONFERENCE OF THE INTERNATIONAL BROTHERHOOD OF TEAMSTERS NATIONAL PENSION FUND
526118572	001	X	BAKERY & CONFECTIONERY UNION & INDUSTRY INTERNATIONAL PENSION FUND
526124754	001		WAREHOUSE EMPLOYEES UNION LOCAL 730 PENSION TRUST FUND
526128473	001	X	FELRA AND UFCW PENSION PLAN
526148924	001		IRONWORKERS LOCAL 16 PENSION PLAN
546060633	001		RETIREMENT PLAN OF BRICKLAYERS LOCAL NO. 1 OF RICH
546071250	001		INTERNATIONAL ASSOCIATION OF BRIDGE STRUCTURAL ORNAMENTAL REINFORCING IRONWORKERS LU NO 79
546124583	001		PENSION PLAN FOR BRICKLAYERS & STONEMASONS UNION 2 OF NORFOLK, VIRGINIA
576041658	068		GREENVILLE PLUMBERS AND PIPEFITTERS PENSION RETIREMENT FUND
586110014	001		GRAPHIC COMMUNICATIONS INTERNATIONAL UNION LOCAL 96B PENSION FUND
621537180	001		ST. LOUIS MOTION PICTURE OPERATORS PENSION FUND
630708442	001		Retail Wholesale & Dept Store
660308040	001		GASTRONOMICAL WORKERS UNION LOCAL 610 AND METROPOLITAN ASSOCIATION PENSION FUND
660344357	001		UNION DE TRONQUISTAS DE PUERTO RICO LOCAL 901 - PENSION PLAN
836011320	001		OPERATING ENGINEERS LOCAL 800 & WYOMING CONTRACTORS ASSOCIATION, INC. PENSION PLAN FOR WYOMING
916024903	001	X	GCIU-EMPLOYER RETIREMENT BENEFIT PLAN
916123695	001		ALASKA IRONWORKERS PENSION PLAN
916145041	001		IDAHO SIGNATORY EMPLOYERS-LABORERS PENSION PLAN
936074503	001		PAINTMAKERS PENSION PLAN
936075453	001		OPERATIVE PLASTERERS LOCAL NO 82 PENSION FUND
941133245	001	X	AUTOMOTIVE INDUSTRIES PENSION PLAN
946052228	001		SAN FRANCISCO LITHOGRAPHERS PENSION TRUST
946076144	001	X	WESTERN STATES OFFICE AND PROFESSIONAL EMPLOYEES PENSION FUND
946272731	001		MARINE CARPENTERS PENSION FUND
946287225	001		BRICKLAYERS AND ALLIED CRAFTSMEN LOCAL 16 PENSION PLAN
946313558	001		RETAIL CLERKS SPECIALTY STORES PENSION PLAN
952238031	001	X	EMPLOYERS' - WAREHOUSEMEN'S PENSION TRUST FUND
956067347	001		SAN DIEGO PLASTERERS PENSION TRUST

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