

2017 METALCASTING OUTLOOK



Managers and executives of North American foundries and diecasters evaluate current business conditions, and give their perspectives on the factors shaping their sector's activity in the coming year.

It seems fair to assume from this moment in time that metalcasting is a permanent fixture in the manufacturing supply chain: other processes may displace some of its functions or applications, but as a forming technology it provides advantages in terms of material science or industrial technology that cannot be displaced. And yet, matching those advantages to a particular requirement, at a specific time, is the unending challenge for metalcasting professionals.

The goal of *FM&T*'s annual Business Outlook Survey is to interpret their challenge now, as 2016 closes and 2017 begins.

Each year during October, *FM&T* surveys metalcasters to capture the insights, concerns, and expectations of men and women working in North America's foundries and diecasting plants. We seek to identify their operations' current situations, the problems they face in their businesses and the economy, to learn what plans they're making for the coming business cycle, and to understand better their expectations for the year now approaching.

We surveyed readers by email over four weeks. The results include responses from dozens of readers who represent the full variety of foundries and diecasters: 20.9% named steel (of any alloy or quality) as the principle metal cast at their plant, and the same percentage cast mainly gray iron. Ductile iron foundries comprise 18.6% of respondents; casting aluminum alloys is the main line of business for 17.8%. While brass and bronze alloys represent 9.3% of the respondents, 12.4% of them cast alloys categorized as "other" (e.g., magnesium, titanium, stainless steel, etc.)

In a similar way, we sought to categorize our respondents with regard to the scale of their metalcasting operations: 24.0% of respondents are attached to large foundries, with 100 to 249 total employees; 20.9% represent mid-sized foundries (50-99 work-

ers), and a nearly equal portion (20.2%) represent small plants, with 20-49 employees. 18.3% are associated with the smallest operations, less than 20 employees, and 12.4% are employed at the largest plants, where there are over 250 employees. Thus, the survey respondents represent the broad scope of individual activities and experience of metalcasting in North America, and their responses and assessments are the basis of our report.

To understand metalcasting's prospects it's necessary to gage manufacturing's prospects. The most reliable index to manufacturing activity is the Institute for Supply Management's Purchasing Managers' Index, which measures activity by supply-chain decision-makers across industrial sectors, some of which are critical consumers of cast metal parts. So, the logic goes, if those sectors are improving, demand for metalcastings will be strong, too.

Through October 2016, PMI determines that manufacturing is "growing," with new orders rising (though at a slower pace than in the recent past), production rates accelerating, and employment increasing. Also, PMI determines that manufacturing inventories are contracting (a trend that has been in place for 16 months), while customers' inventories are gaged to be too low. Manufactured goods prices are considered to be "too low," the purchasing managers concluded. Overall, from the PMI evaluation, the overall economy is growing, as it has done for 89 consecutive months.

Projecting from these readings though, ISM suggests consumer activity will continue to be critical to keeping U.S. economic activity growing in 2017: a robust recovery in industrial spending is the necessary factor that would drive real economic growth. There are signs in the October PMI, as there has been over recent months, that industry may be set for that breakout.

What is the principal metal that you cast?

Aluminum	17.8%
Brass/Bronze	9.3%
Ductile Iron	18.6%
Gray Iron	20.9%
Steel	20.9%
Other	12.4%

How many employees work in your metalcasting operation?

Under 20	18.6%
20 to 49	20.2%
50 to 99	20.9%
100 to 249	24.0%
Over 250	16.3%

Looking around, looking ahead

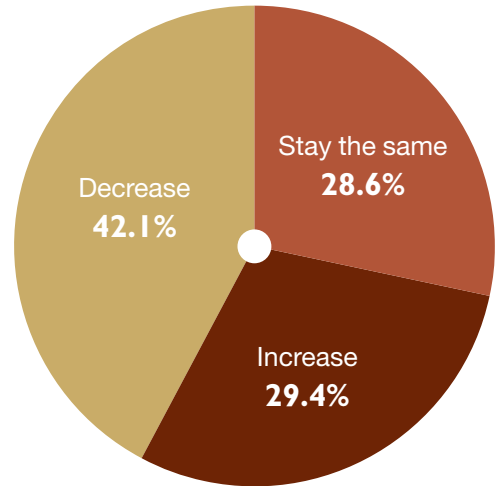
PMI assesses the manufacturing sector generally, but metalcasting has its own variables and prerogatives, and we started our Outlook survey by gaging readers' sense of recent and current metalcasting business conditions — using casting shipment volumes (tonnage) to characterize their circumstances. A plurality of all respondents, 42.1%, indicated that 2016 shipments will fall below 2015 shipments; the remaining respondents were nearly evenly split, with 29.4% saying the current year's shipments will increase over last year, and 28.6% concluding that 2016 shipments will be about the same as the 2015 tonnages.

The sizes and types of metalcasting operations offer no clear explanation for their 2016 outcomes: iron and steel foundries seem nearly as likely as aluminum and nonferrous operations to have improved. Aluminum foundries are slightly more likely than ductile iron and steel foundries to indicate 2016 shipments increasing over 2015, but again, DI and steel plants were equally likely to report current year's totals will trail last year's results.

Smaller (20-49 employees) and large (100-249 employees) plants were equally likely to report 2016 results will improving on 2015 results, but the those smaller plants (20-49 employees) were even more likely to note this year will end with lower volumes shipped, and that total is equal to the number of midsized (50-99 employees) plants, and only slightly more than large (100-249 employees) plants, expecting lower shipments levels.

Let's look deeper. Starting with the latter set, we learn that even those respondents whose current year shipments are on track to improve over the 2015 results are not growing vigorously: 55.3% of these respondents indicated that the current year's results will rise 1 to 10% over last year; 27.7% are expecting 10-25% improvements; and 12.8% are expecting a 26-50% improvement. Just 2.1% anticipate an improvement of 51 to 75%, and an identical 2.1% expect a 76-90% improvement.

How will your 2016 casting shipments (tonnage) compare with 2015 shipments?



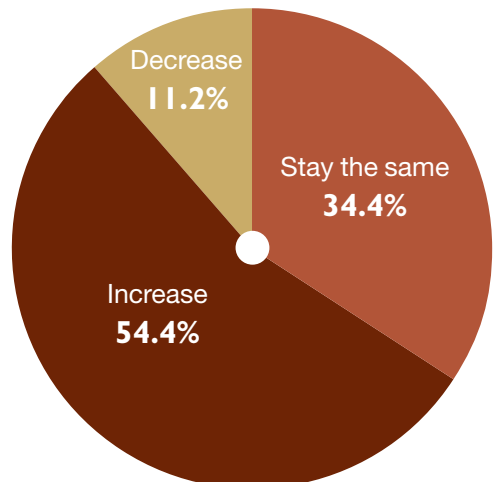
If you selected increase for Q3, by what percentage (estimate)?

0-10%	55.3%
10-25%	27.7%
26-50%	12.8%
51-75%	2.1%
76-90%	2.1%
+90%	0.0%

If you selected decrease for Q3, by what percentage (estimate)?

0-10%	23.7%
10-25%	37.3%
26-50%	37.3%
51-75%	1.7%
76-90%	0.0%
+90%	0.0%

How do you expect your 2017 casting shipments (tonnage) to compare with 2016 shipments?



If you selected increase for Q6, by what percentage (estimate)?

0-10%	45.8%
10-25%	37.5%
26-50%	11.1%
51-75%	4.2%
76-90%	1.4%
+90%	0.0%

If you selected decrease for Q6, by what percentage (estimate)?

0-10%	54.2%
10-25%	29.2%
26-50%	12.5%
51-75%	0.0%
76-90%	0.0%
+90%	4.2%

On the other hand, of respondents who are anticipating an overall decline in 2016 year-over-year shipments, 23.7% expect this year's results to be 1-10% less than the 2015 result; 37.3% anticipate the current year's tons/shipped to fall 10-25% lower than last year's total, and an equivalent 37.3% indicate that 2016 tons/shipped will fall 26-50% below the 2015 total. Just 1.7% reported that 2016 shipments will fall 51-75% lower than 2015 shipments.

The survey took the same approach to evaluate metalcasters' 2017 business prospects. In this instance, a majority of all respondents, 54.4%, expect that they will see better results in 2017 — i.e., ship more tons of castings — than they will do in 2016. More than one-third, 34.4%, believe that tons/shipped will remain even from 2016 through 2017, and 11.2% expect a decline in shipment totals during 2017.

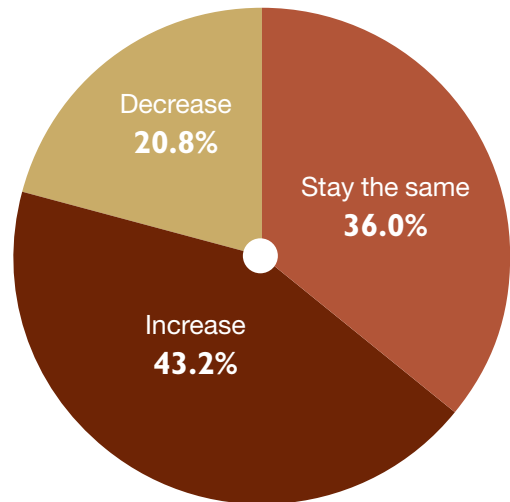
Ductile iron, gray iron, and steel foundries are equally as likely to forecast increased shipment volumes in 2017 as they are to call for decreased volumes. Aluminum operations are nearly 10% more likely to forecast an increase in shipments.

Large (100-249 employees) operations are decidedly more likely than other types of foundries to forecast improved shipment totals for 2017 than they've had in the current year. Small (20-49 employees) and midsized (50-99 employees) are slightly above the average in their optimistic outlook about 2017 shipments.

Among the more positive respondents, we found that 45.8% expect the 2017 improvement to range up to 10%, and 37.5% expect it to rise between 10 and 25%. 11.1% of these anticipate improvements of 26 to 50%, and 4.2% are forecasting improvements of 51 to 75%.

Among the less optimistic segment, 54.2% foresee tons/shipped falling by some figure up to 10% of the current year's total, while 29.2% expect a decline of 10 to 25% of their 2016 total. Among these, 12.5% anticipate a decline of 26-50%, and while no

How will your 2017 capital expenditures compare to your 2016 capital expenditures?



If you selected increase for Q9, by what percentage (estimate)?

0-10%	47.5%
10-25%	36.1%
26-50%	13.1%
51-75%	3.3%
76-90%	0.0%
+90%	0.0%

If you selected decrease for Q9, by what percentage (estimate)?

0-10%	31.0%
10-25%	31.0%
26-50%	13.8%
51-75%	0.0%
76-90%	10.3%
+90%	13.8%

respondent foresees declines from 51-90%, there is a 4.2% segment predicting a 2017 decline in shipments over 90%.

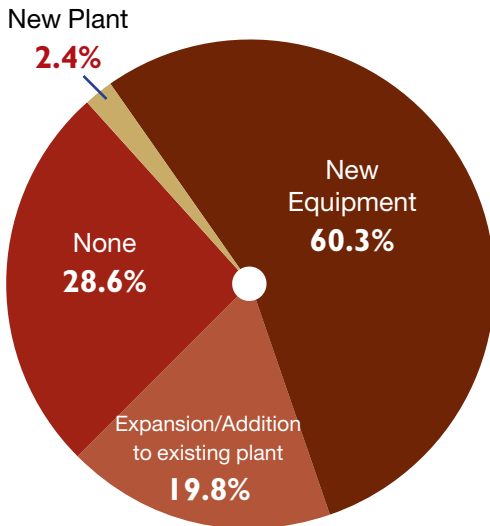
Difficult reading

“Business confidence” is difficult to quantify, and difficult to interpret as an economic indicator, but when evaluating the narrower circumstances of a single manufacturing sector (i.e., metalcasting), the implications are clearer.

We asked survey respondents to project their capital-expenditure plans for 2017. A plurality, 43.2%, indicate they will be increasing capital spending next year, while another 36% note they will be maintaining their 2016 levels of investment; 20.8% indicated they will decrease capital investment totals for 2017.

Among the respondents, ductile iron foundries are equally likely to be planning an increase or a decrease in capital invest-

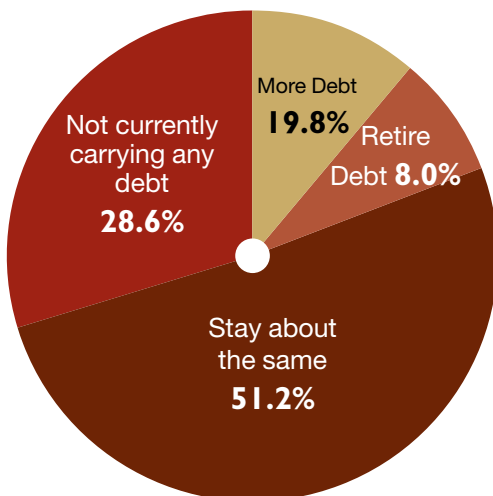
What types of capital expenditures are you planning in 2017?



Please estimate your total planned capital expenditures for 2017.

Less than \$100,000	42.5%
\$101,000 to \$250,000	17.5%
\$251,000 to \$500,000	13.3%
\$500,000 to \$1 million	14.2%
\$1 million to \$5 million	5.8%
More than \$5 million	6.7%

What are your borrowing plans for 2017?



ments for next year, and that is true for steel foundries, too. Aluminum foundries are three times more likely to report they will be increasing capital investments in 2017.

Large foundries (100-249 workers) are the most likely to be planning to increase capital investments in 2017, while very large foundries (over 250 workers) are the most likely to be planning to decrease spending – though that total is still somewhat lower than the number of operations planning to increase their spending.

Do you plan to purchase any of the following types of equipment in 2017?

Air compressors	12.8%
Automatic pouring system	6.4%
Blast cleaning equipment	21.1%
Continuous mixers	9.2%
Conveyors	13.8%
Coremaking machines	14.7%
Cranes/hoists	16.5%
Cutoff equipment	8.3%
Design software/hardware	15.6%
Diecasting machines	3.7%
Grinding equipment	22.9%
Heat treating equipment	12.8%
Investment casting system	4.6%
Lab equipment	18.3%
Lift trucks or loaders	16.5%
Lost foam system	0.9%
Machine tools	14.7%
Melting equipment	18.3%
Molding machines	14.7%
Permanent mold system	2.8%
Pollution controls	22.0%
Power control equipment/systems	7.3%
Process computers	11.0%
Rapid prototyping equipment	5.5%
Robots/manipulators	19.3%
Sand Prep equipment	15.6%
Sand reclamation equipment	14.7%
Shakeout/punchout equipment	7.3%
Simulation software	8.3%
Testing/inspection equipment	23.9%
Other	11.0%

Indicate which of the following issues have been significant problems for your operation during 2016:

Availability of Capital	11.1%
Energy Costs	27.0%
Energy Shortages	7.1%
EPA Requirements	19.8%
Human Resources	33.3%
Imported Castings	27.8%
Interest Rates	2.4%
Labor Costs	15.1%
Labor Shortage	31.0%
Lack of Orders	46.0%
Material Shortages	3.2%
Medical/Insurance Costs	24.6%
On-Time Delivery of Castings	14.3%
OSHA Requirements	23.8%
Plant Management	9.5%
Plant Operations	7.9%
Product Liability	2.4%
Product Marketing/Sales	11.1%
Quality of Castings	11.1%
Raw Materials Cost	10.3%
Training	15.9%
Workers' Compensation Costs	7.1%
Other	7.9%

Indicate which of the following issues are likely to be significant problems for your operation in 2017:

Availability of Capital	13.7%
Energy Costs	25.0%
Energy Shortages	5.6%
EPA Requirements	18.5%
Human Resources	21.8%
Imported Castings	23.4%
Interest Rates	3.2%
Labor Costs	17.7%
Labor Shortage	29.0%
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OSHA Requirements	25.8%
Plant Management	7.3%
Plant Operations	8.1%
Product Liability	0.8%
Product Marketing/Sales	8.9%
Quality of Castings	9.7%
Raw Materials Cost	11.3%
Training	10.5%
Workers' Compensation Costs	6.5%
Other	4.0%

The scale of capital-investment increases or decreases also is indicative of business confidence: 47.5% will be raising capital outlays by 1 to 10%, and 36.1% will be raising the current total by 10 to 25%; 13.1% will increase 2017 expenditures by 26 to 50%.

On the other side, 62% of the respondents who plan to decrease 2017 capital investments over current-year totals will be doing so in the range of 1 to 25%, while 13.8% will be decreasing the total by 26 to 50%, and an equal percentage will be decreasing their expenditures total by over 90%.

On the matter of how they will invest in 2017, our respondents are somewhat clearer: 60.3% plan to acquire new production equipment, and 19.8% indicate their investments will cover expansions or additions to their existing plants. 2.4% of respondents will be investing in new plant construction.

The value of planned investments is another important indicator of business confidence: 42.5% of respondents indicate their capital outlays will total \$100,000 or less; 17.5% will be investing \$101,000 to \$250,000; and 14.2% will be investing \$500,000 to \$1 million. Worth noting is that 6.8% of respondents represent organizations that will be investing more than \$5 million in 2017.

And what will be the source of those investment dollars? 51.2% of respondents indicated their borrowing plans for 2017 will not increase debt totals; 11.2% intend to take on more debt.

As to what those investments will accomplish, the list is extensive. We invited respondents to indicate all types of process

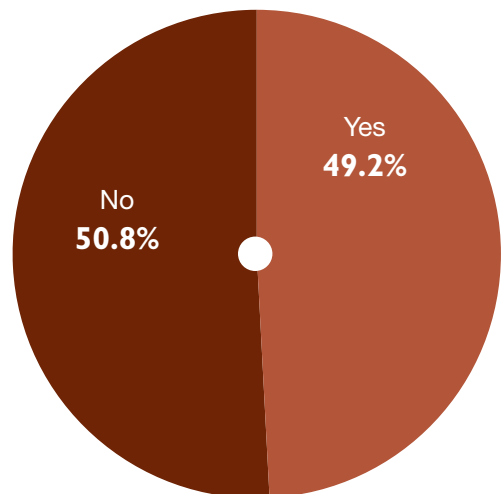
How are casting imports affecting your business?

No affect	32.5%
Becoming more of a competitive factor	49.2%
Becoming less of a competitive factor	13.5%
We're building our own export business	4.8%

What percentage of normal plant capacity is represented by your 2016 average monthly casting production? (Normal being the number of employees, shifts, and days your plant typically

0-50%	17.4%
51-60%	28.1%
60-75%	19.0%
76-90%	27.3%
91-100%	7.4%
+100%	0.8%

Do you plan to increase employment totals during 2017?

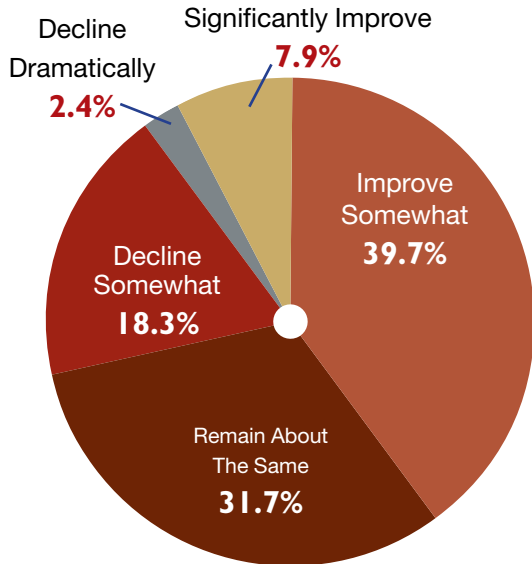


equipment and technology they plan to invest in during 2017, and the results show there is a desire (or a need) across the metal-casting production sequence. The most popular choice (23.9% of all respondents) is for new product testing/inspection technology; grinding equipment (22.9%) was the next most popular choice, followed by pollution controls (22.0%) and blast cleaning equipment (21.1%). These are followed by robotics technology (19.3%) and, in a tie, lab testing equipment and melting systems (both at 18.3% of the total.)

Respondents' sense

The same, multiple-choice approach was offered to gauge respondents' sense of business conditions and managerial problems facing metalcasters, in 2016 and 2017. For the current year, 46.0% of all respondents identified the "Lack of orders" as a

How do you feel the overall U.S. economy (GDP) will perform in 2017 compared to 2016?



“significant problem,” a plurality that reinforces the previous conclusion that 2016 will result in lower shipment volumes than 2015. Other significant problems in the current business climate are “Human resources” (33.3%), “Shortage of qualified workers” (31.0%), “Imported castings” (27.8%), and “Energy costs” (27.0%). “Medical/insurance costs” (24.6%) and “OSHA requirements” (23.8%) also were identified by significant numbers of respondents.

We asked survey respondents a similar question to evaluate their level of concern over different issues going forward. “Lack of orders” again led the list of concerns, drawing 39.5% of all respondents on this multiple-choice list; and the “Shortage of qualified workers” (29.0%) also continued to concern our readers. “OSHA requirements” is a matter of ongoing concern, as is “Energy costs” (25.0%), “Imported castings” and “Medical/insurance costs”, the latter two each drawing 23.4% of respondents’ concerns. “Human resources” again ranks (21.8%) among the most common concerns.

Turning the lens

Narrowing our inquiries to metalcasting industry concerns gives a unique insight to their view of this core market. Taking their perspective on the broader economic picture turns the lens in the opposite direction, and gives us their particular understanding of the wider economy. *FM&T* Outlook survey respondents may be described as “sanguine” to “confident” in their view of U.S. market prospects for 2017: while 31.7% indicated U.S. economic performance will be “about the same” as it

has been for 2016, a somewhat larger segment, 39.7% forecast improvement from the current situation. A not-inconsiderable 18.3% of respondents are expecting U.S. economic conditions to decline next year.

And, in a further reflection on those opinions, 50.8% of respondents told us they would not be increasing employment totals in 2017, though 49.2% will add new workers.

One admirable aspect of the metalcasting industry is its collegiality, and the professional solidarity among businesses and individuals. They appreciate their opportunities, they under-

Which of these will be most effective at encouraging professional growth in metalcasting?

Additional scholarships and internships	16.1%
Additional or alternate training programs (programs at colleges, trade schools)	42.4%
More active involvement of metalcasters with trade associations and colleges	30.5%
New professional associations (geographical? market-focused? industry-specific etc.)	11.0%

Which of these market areas offers the most promise for the growth of your metalcasting operation?

Alternative energy (nuclear, wind, solar)	8.1%
Automotive engines	7.3%
Other automotive components	10.6%
Off-road vehicle and equipment	6.5%
Medical / surgical equipment or devices	2.4%
Infrastructure and construction	21.1%
Oil/natural gas	18.7%
Other, please specify	9.8%
None of the above	15.4%

stand the importance of their work and their products, and they seek to improve the prospects for metalcasting. We sought respondents’ opinions on how to encourage professional growth: 42.4% advocated additional or alternative training programs; and 30.5% expressed a desire for more involvement by metalcasters and their organizations in trade and professional development programs.

We also asked respondents to identify market segments that would support metalcasting industry growth and improvement: “Infrastructure and construction” programs were identified by 21.1% of respondents, while “Oil/natural gas” projects were tabbed by 18.7% of respondents.

As 2017 arrives the metalcasting industry can be confident it has the experienced personnel, strategic insights, and technological resources to drive almost any growth strategy, or to combat any challenge to its stability and resourcefulness. What it needs, what it hopes for, is the opportunity to grow and expand, and to demonstrate the breadth of its potential. 🏠

