Container Coating Performance & Future Direction

Executive Management Report

Analysis of the COA 2026 coatings survey

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1. Executive summary

The survey indicates a systemic performance gap: current water-borne coating outcomes are widely regarded as less durable than pre-2017 solvent-based systems, with process control identified as the dominant management issue.

38 industry responses across owners, lessors, surveyors, manufacturers and coating suppliers

65%	55%	50%
rate current coatings worse than pre-2017	report first failures within five years	support a fundamental industry rethink

- The development of waterborne coatings has been driven by environmental legislation that requires the lowering of volatile organic components (VOC's) which effectively restricts the use of solvent coatings on container production lines.
- Only 22% rate current coating condition as good or very good; 30% rate it poor or very poor, with the largest group selecting moderate.
- Peeling, blistering and flash rust dominate reported defects. Exterior panels are the most frequently identified failure location, followed by interior panels.
- Comments repeatedly link poor outcomes to insufficient drying and curing, high line speed, humidity, inadequate temperature control, surface preparation and inconsistent compliance with paint-supplier requirements.
- The commercial evidence is directionally serious but incomplete: many respondents report increased repair activity and reduced expected life or resale value, while cost data remain limited.
- The industry is not aligned on a single replacement technology. Solvent-based high-solids and powder coatings attract the strongest interest, but each has capital, environmental or application constraints.

2. Survey profile and evidential basis

The survey received 38 responses. The sample includes inspection, supply, manufacturing and asset-owner perspectives, improving the breadth of operational experience represented. It is nevertheless a perception survey rather than a statistically controlled fleet study. Percentages should therefore be treated as directional indicators of industry experience, not as measured failure incidence across the global fleet.

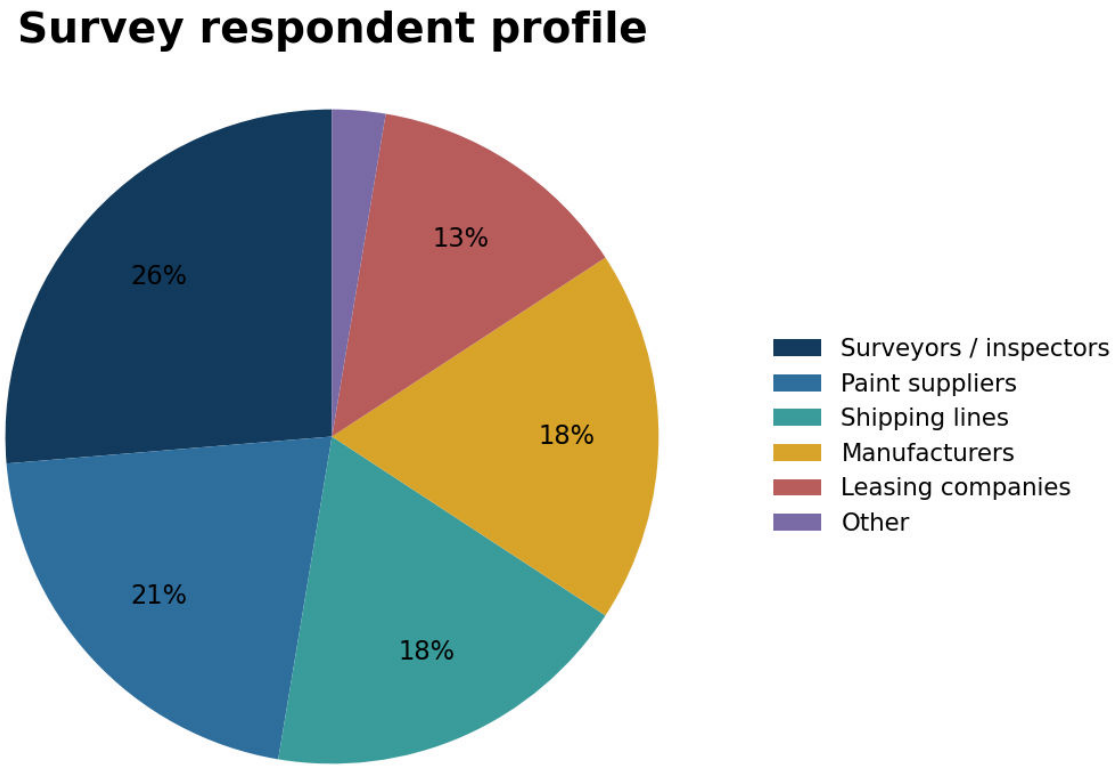


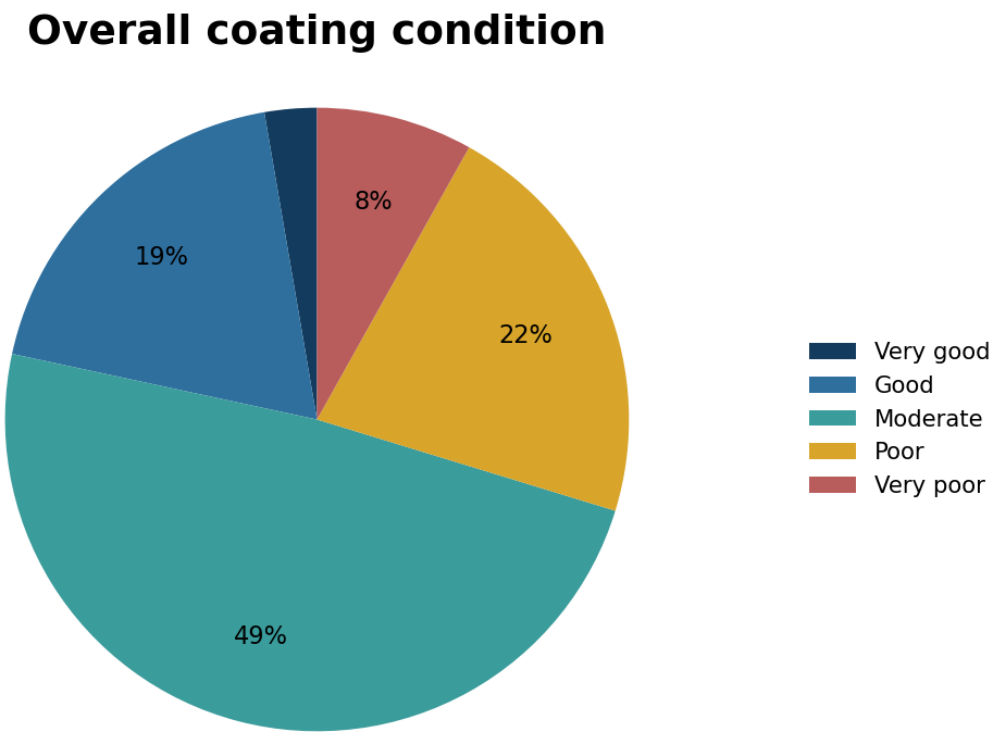
Figure 1. Respondent mix (38 responses).

Evidence limitations

- Responses vary by question (typically 34-38).
- Several questions allow multiple selections and therefore do not represent a part-to-whole distribution.
- Reported defect volumes range from isolated cases to thousands of TEU but are not normalised against respondent fleet size or production series.
- Written comments reveal strong experience-based views but do not establish causation without production records, coating specifications and laboratory or field validation.

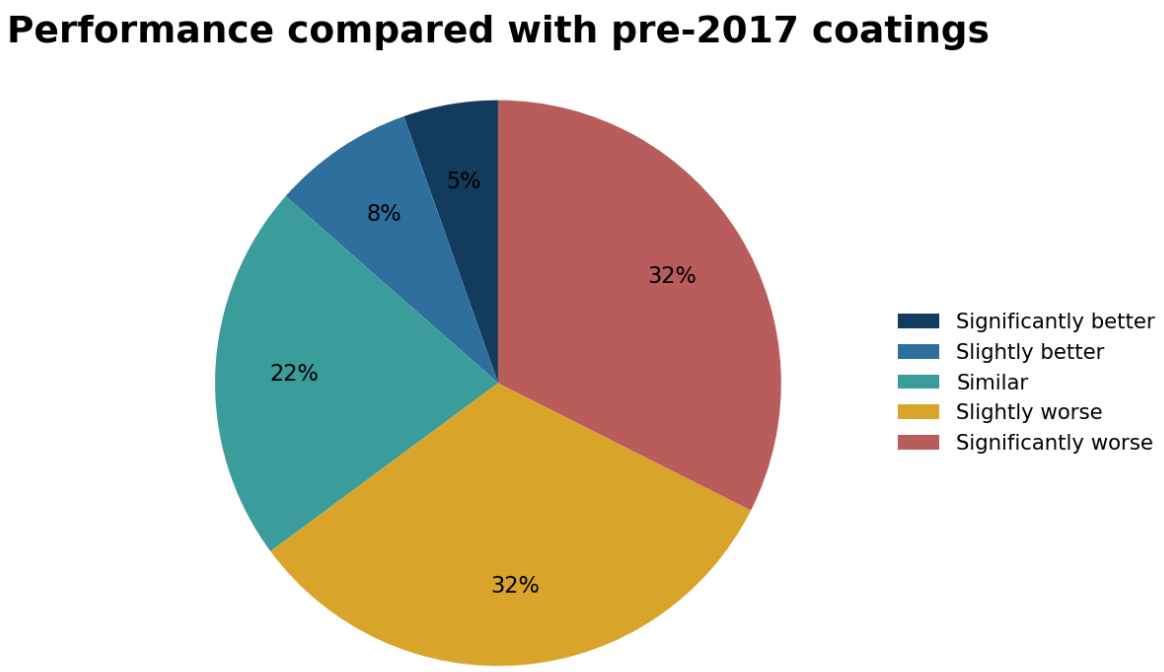
3. Performance findings

Overall condition



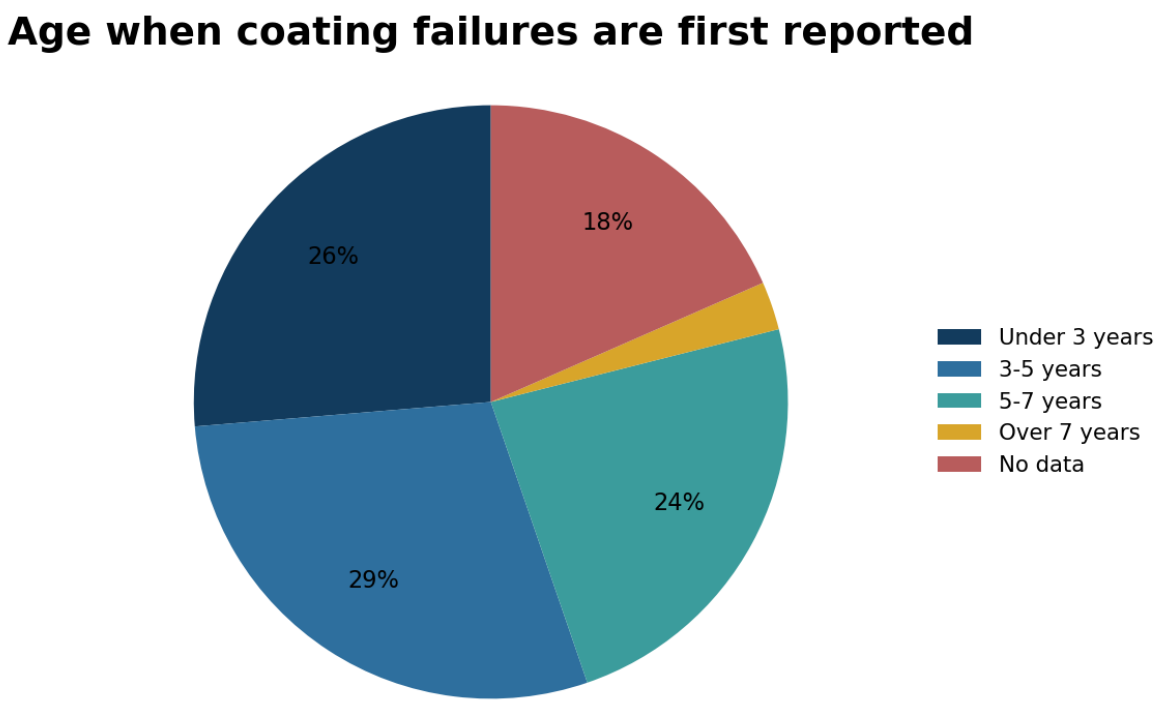
The modal assessment is moderate (49%). Poor and very poor account for a further 30% while good and very good total only 22%

Comparison with pre-2017 systems



Twenty-four of 37 respondents (65%) rate current coatings slightly or significantly worse than pre-2017 coatings. Only five respondents rate them better.

Failure timing and defect pattern



Twenty-one of 38 respondents report first failures within five years. A further nine place first reports at five to seven years. Only one respondent selected more than seven years.

Finding	Survey result	Management interpretation
Defect types	Peeling 66%; bubbles/blisters 66%; flash rust 63%; pinholes 31%	Pattern is consistent with adhesion, moisture and film-formation problems.
Locations	Exterior panels 79%; interior panels 53%; door area 35%; welds/edges 32%	Inspection and process controls should prioritise large panels, internal surfaces, edges and difficult-to-cure zones.
Repair trend	49% report increased repairs; 43% have no data	Direction is adverse, but owners need consistent repair coding and cost capture.

4. Root causes and operational implications

The written comments are unusually consistent: respondents repeatedly distinguish between the coating formulation and the conditions under which it is applied. Water-borne systems are described as capable of satisfactory performance when application requirements are respected, but less tolerant of production shortcuts and environmental variability than earlier solvent-based systems.

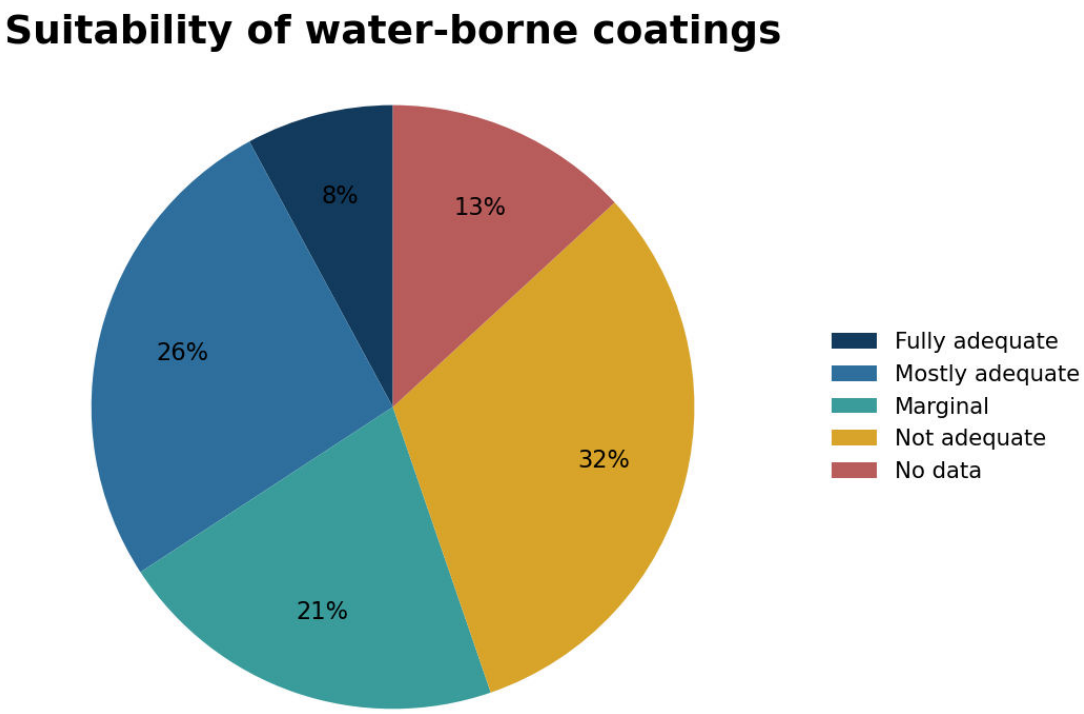
Dominant root-cause themes

Drying and curing	Insufficient inter-coat drying; residual water in primer or intermediate coats; premature top-coating.
Production throughput	Line speed and output targets exceeding booth and curing capacity; large logos and manual work extending process time.
Environmental control	High humidity, low temperature, rainfall exposure and inconsistent use or performance of heating/cooling booths.
Surface and application quality	Contamination, inadequate preparation, primer adhesion failure, over-spray and excessive dry film thickness.
Governance	Insufficient adherence to paint-supplier instructions and inconsistent factory supervision, inspection and traceability.

Management implication

The immediate control point is the production process, not merely product selection. Any coating strategy that ignores booth capacity, line speed, cure verification and factory discipline risks repeating current failures with a different chemistry.

5. Commercial and asset-life impact

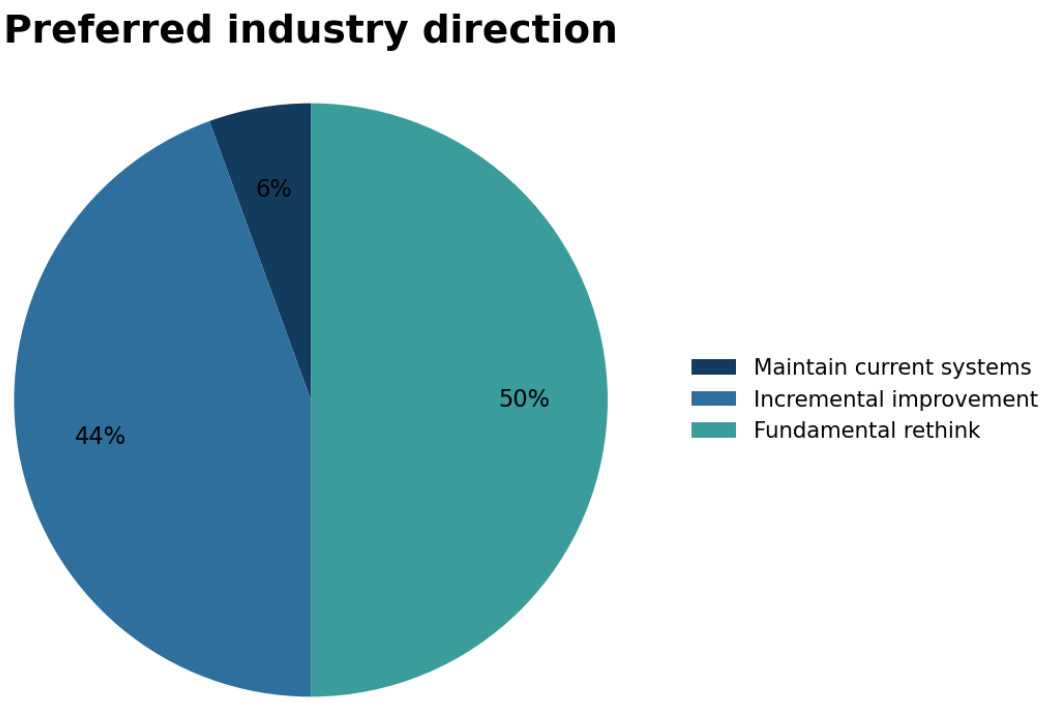


Only 34% consider water-borne coatings fully or mostly adequate; 53% select marginal or not adequate, with 13% reporting no data.

Commercial issue	Survey indication
Expected asset life	57% expect a reduction of two, four or six years; 16% expect similar life; 27% do not know.
Resale value	47% expect reduced end-of-life value; 19% do not; 33% do not know.
Maintenance cost	39% identify increases from 5% to over 30%; 55% cannot quantify the impact.
Warranty	Half see value in an extended warranty; 43% prefer seven years, and 26% prefer ten years or more.
Price appetite	39% say buyers would pay more; 31% say no; 31% depend on ROI. Acceptable premium is generally capped at 10%.

The business case for change should be based on whole-life cost: repair frequency, downtime, inspection, claims, early disposal and resale value. The survey identifies the relevant value drivers but does not provide sufficiently consistent cost data to calculate an industry-wide ROI.

6. Future direction and investment appetite

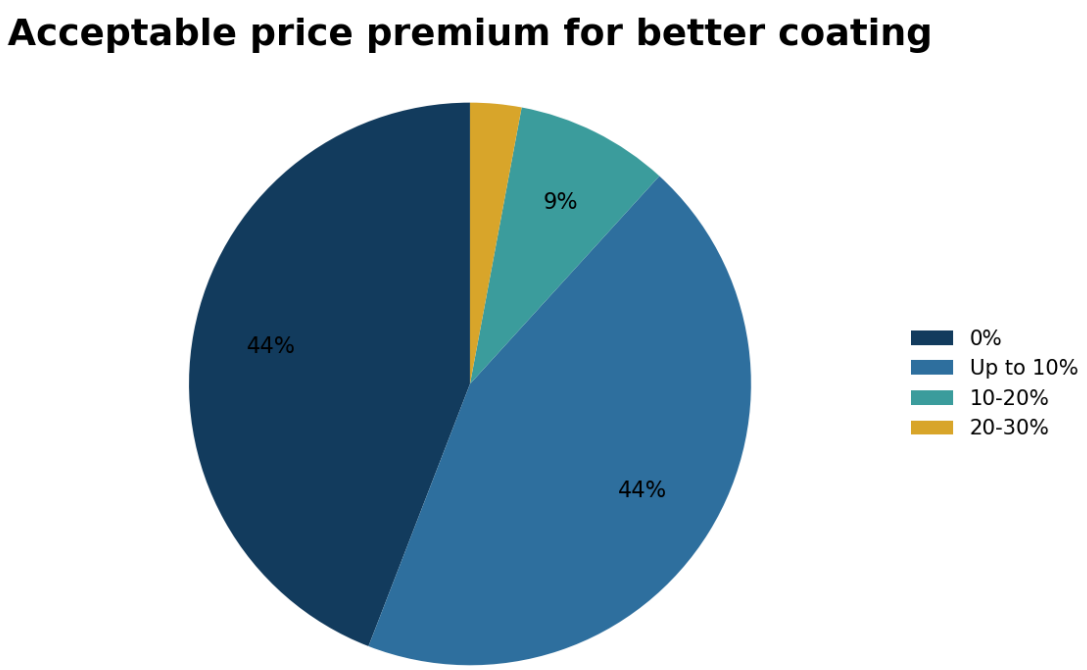


Ninety-four per cent favour either incremental improvement or a fundamental rethink. Only 6% support maintaining current systems without change.

Technology preferences

Option	Selected by respondents*	Principal qualification from comments
Solvent-based high solids	72%	Can use existing lines more readily, but VOC, pot-life and cleaning issues remain.
Powder coatings	64%	Viewed as durable, but requires high capital investment, thickness control and high-temperature curing.
New technologies	19%	Strong demand for real-service trials and independent benchmarking.
Hybrid systems	17%	Potential transition route, but limited evidence in survey comments.
Water-borne	11%	Retained by a minority, conditional on adequate line capacity and rigorous process control.

*Multiple selections allowed; percentages do not sum to 100%.



Eighty-eight per cent would accept no premium or no more than 10%. Any improved system must therefore demonstrate a clear and credible whole-life return within a tightly constrained purchase-price envelope.

7. Management recommendations

1. Establish an industry coating-performance programme

Create a common defect taxonomy, fleet-age bands, production-series identifiers and standard repair-cost reporting. Build a confidential database linking failures to factory, line, season, coating system and application records.

2. Strengthen factory process assurance

Specify minimum booth capacity and environmental controls; record steel temperature, humidity, dew point, wet/dry film thickness and verified inter-coat cure. Treat line-speed changes as a controlled process change.

3. Introduce risk-based production inspection

Increase surveillance during winter/high-humidity production, line ramp-ups, factory modifications and high-output periods. Prioritise interior roofs, side/end panels, welds, edges and understructure.

4. Validate alternatives through controlled field trials

Run comparable trials of optimised water-borne, high-solids, powder and hybrid systems. Use identical substrates, preparation standards and inspection protocols, then track performance in representative marine and multimodal service.

5. Align warranty with evidence and accountability

Develop a standard seven-year baseline proposal, with clear exclusions and shared responsibility among paint supplier, container manufacturer and buyer. Require traceable production records to support claims.

6. Build the commercial case on whole-life value

Model first-repair timing, repair frequency, asset availability, claims, early disposal and resale. Use these metrics to define the maximum acceptable price premium and to prevent lowest-CAPEX decisions from creating higher lifecycle cost.

7. Publish an industry benchmark

COA should coordinate anonymised results, testing protocols and periodic progress reports to challenge supplier claims and accelerate adoption of proven improvements.

Appendix: headline survey metrics

Question area	Headline result
General coating condition:	Moderate 48.65%; poor/very poor 29.73%; good/very good 21.62%
Compared with pre-2017:	Worse 64.86%; similar 21.62%; better 13.52%
First failure age	<3 years 26.32%; 3-5 years 28.95%; 5-7 years 23.68%; >7 years 2.63%; no data 18.42%
Common failure locations*	Exterior panels 79.41%; interior panels 52.94%; door area 35.29%; welds/edges 32.35%
Nature of defects*	Peeling 65.71%; bubbles/blisters 65.71%; flash rust 62.86%; pinholes 31.43%
Water-borne adequacy:	Fully/mostly adequate 34.21%; marginal/not adequate 52.63%; no data 13.16%
Expected life reduction:	2 years 21.62%; 4 years 16.22%; 6 years 18.92%; similar 16.22%; unknown 27.03%
Preferred development*	High-solids 72.22%; powder 63.89%; new technologies 19.44%; hybrid 16.67%; water-borne 11.11%
Industry direction:	Fundamental rethink 50.00%; incremental improvement 44.44%; maintain current 5.56%
Preferred warranty:	5 years 31.43%; 7 years 42.86%; 10 years 17.14%; >10 years 8.57%

*Multiple-selection question. Source: COA Survey: Container Coating Performance & Future Direction, 2026 (38 total respondents; response count varies by question).