

NOT ENOUGH AVIATION MECHANICS

How the industry can address this decade's shortage in aircraft maintenance workers



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INTRODUCTION

After a summer of flight cancellations and delays, the pilot shortage has become an all-too-real phenomenon with which airlines and the traveling public are learning to cope. But while no one can ignore empty cockpits, behind the scenes yet another labor shortage looms — not enough aircraft mechanics.

While there were just enough to handle the maintenance, repair, and overhaul (MRO) workload on the North American fleet in 2022, our latest forecast suggests that a shortfall of somewhere between 12,000 and 18,000 is likely to be the case in 2023. That imbalance between supply and demand — including licensed and unlicensed labor working on aircraft and in the backshops — will persist through the rest of the decade and threaten aviation's ability to grow profitably if it remains unaddressed.

Fears of a mechanics' shortage have been discussed for years. In 2017, Oliver Wyman predicted a gap between supply and demand developing in 2022 and peaking in 2027. Of course, the near grounding of the global fleet in 2020 by the COVID-19 pandemic made the issue irrelevant for a time. But anxiety over a dearth of aircraft maintenance workers was pushed to the forefront again as the pandemic waned and the raft of early retirements during COVID began to put a squeeze on the labor market. Aviation executives ranked a potential mechanics' shortage MRO's No. 1 headache in [Oliver Wyman's annual survey](#) earlier this year.

Here, in this report, Oliver Wyman looks at the challenges the industry faces because of that impending shortage, and areas it can address — including recruitment, retention, training, regulation, and productivity — to help mitigate it.

SIZING UP THE SHORTFALL

Next year, Oliver Wyman envisions a gap in North America between the supply of mechanics and other aircraft maintenance workers and demand for them of between 8% and 12%. That shortfall and the larger ones anticipated later in the decade may result in fewer flights and delays and cancellations, or airlines having to compensate by keeping more spare aircraft and parts on hand.

By 2027 — projected to be the worst year for the shortage — the bleakest scenario has the supply deficit at more than 48,000 aircraft maintenance workers, or a shortfall of about 27%. Our more likely scenario predicts a gap of almost 43,000, or more than 24%.

The projected shortage is based on responses from airlines and independent MRO companies to an Oliver Wyman survey, which included questions about the age demographics, expected retirements, and hiring trends for their workforces. We also used government data from the Federal Aviation Administration (FAA) in the United States and Transport Canada. The data was then leveraged to create multiple forecast scenarios of how the industry might look over the next decade. Our supply side tallies are based on the numbers of mechanics, unlicensed and licensed, and repair workers — essentially every maintenance technician who works directly on the aircraft or in backshops.

Additionally, we incorporated analysis on growth in the size of the fleet and MRO spending from [Oliver Wyman's Global Fleet and MRO Forecast 2022-2032](#). That report anticipates North American fleet growth of 1.8% annually over the next 10 years, reaching 9,500 aircraft by 2032. We expect demand for MRO workers to lag fleet expansion slightly at 1.6% annually through 2032, with faster growth in the first part of the forecast. Later in the decade, growth in MRO demand will slow significantly as the region undergoes a significant re-fleeting — replacing older, more maintenance intensive aircraft with new models.

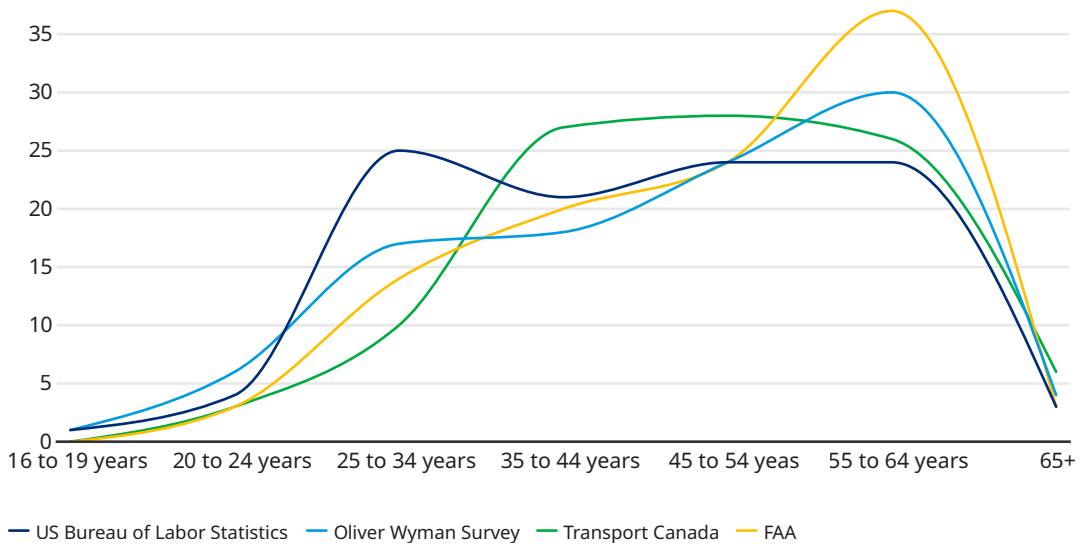
THE BABY BOOMER EFFECT

Behind this future shortage is an aging workforce with baby boomers preparing to retire. Added to that are the thousands of mechanics who took early retirement during the COVID-19 pandemic. The Oliver Wyman survey and government data indicate as much as 35% of the current workforce is 55 to 64 years old, putting more than one-third at or near retirement. The average retirement age for a mechanic was 62 before the COVID-19 pandemic, based on Oliver Wyman’s analysis. There is no mandatory retirement age for mechanics as there is for pilots.

Today, most aircraft mechanics are over 40 years old, with the percentage between 18 and 30 in the single digits. Given these projections, the number of workers expected to call it quits over the next few years is simply too big to be offset by hiring alone. Bottom line: Over the next few years, there’s little the industry can do to avoid completely the anticipated shortage.

But there are a variety of possible remedies the industry might try to mitigate it. We created three scenarios to test the impact of various approaches to solving the problem.

Exhibit 1: North American aviation maintenance technician age profiles by data source



Source: US Bureau of Labor Statistics, Transport Canada, Federal Aviation Administration, Oliver Wyman analysis

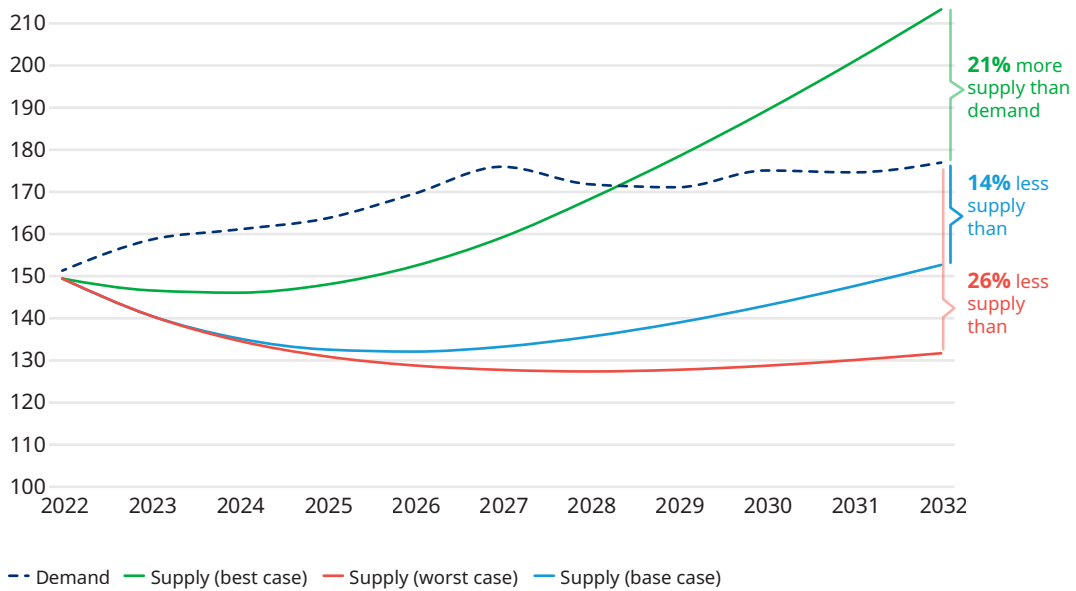
OUR SCENARIOS

In our baseline scenario, the growth in hiring would return to pre-COVID rates, increasing on average 2% per annum for the next 10 years. The mechanics' shortage could be expected to last through 2032, when the supply deficit would shrink to just over 24,000 workers, or a gap of about 14%. The number of retirements is expected to drop in the second half of the forecast as baby boomers age out of the workforce.

In our best-case scenario, the industry takes an aggressive posture: It would work to push out the average retirement age five years and hiring would double by 2027. Even with this unprecedented increase in new employees and retirement age, there would still be a small shortfall through 2028. The deficit would become a surplus in 2029.

In our worst-case scenario, we assume hiring does not return to pre-COVID levels. By 2032, there would be a 26% gap between supply and demand and the deficit would expand to more than 45,000 mechanics. We consider this scenario highly unlikely as it suggests the industry does almost nothing in response to the shortage.

Exhibit 2: North America aviation maintenance technician supply and demand



Source: Oliver Wyman analysis

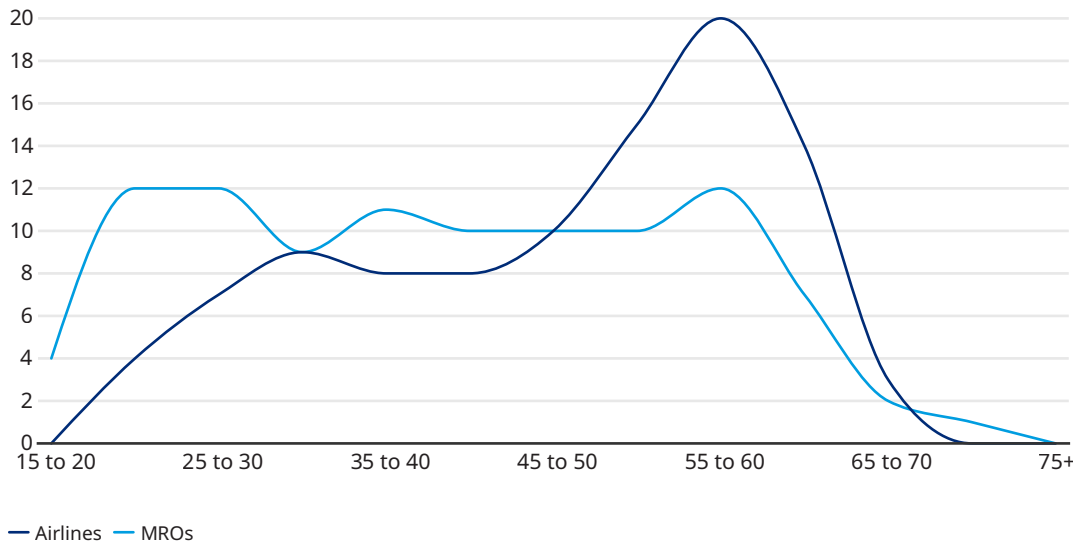
THE IMPACT

The pain from the shortage will affect everyone in the industry, from the smallest MRO to the largest airline. Even though major airlines tend to offer higher pay and benefits and will likely have the easiest time keeping their ranks full, they too will have to scramble. Almost all operators outsource MRO to some extent, which means no one escapes unscathed, and the inevitable pressure on wages will affect the entire industry.

Still, no matter the size of the shortage, independent MROs and regional airlines will likely feel the effects the most. Historically, independent MROs and regionals serve as an entry point for mechanics, many of whom eventually move on to work for major airlines.

For this reason, the age of the workforce at the bigger carriers skews older than at MROs. As these airlines see larger numbers of retirements from their current workforce, they will hire replacements from independent MROs and regionals.

Exhibit 3: North America aviation maintenance technician age profiles by employer type



Source: Oliver Wyman analysis

HOW TO RESPOND

RECRUITMENT AND RETENTION

As it is with pilots, one of the realities fueling the shortage of mechanics is a dwindling pool of people interested in pursuing careers in aviation. Younger, tech-savvy generations no longer perceive aviation as a cool, cutting-edge industry. Instead, many think of it as an industry prone to boom-and-bust cycles and not aligned with their goals for cutting greenhouse gas emissions and fighting climate change.

The job of the mechanic doesn't require a college degree but does entail considerable training. To move up the ranks, mechanics get certified by the FAA or Transport Canada. In the case of the FAA, to qualify for airframe and powerplant (A&P) certificates, or licenses as they are often called, candidates often attend FAA-certified schools. The course work can typically cost around \$17,000 and take as much as 22 months to complete.

Candidates can also accumulate experience on the job or in the military toward A&P certificates. To be eligible to take a test for either an airframe or a powerplant certificate, federal rules require that mechanics accumulate a minimum of 18 months of 40-hour per week practical experience, or 30 months of concurrent experience for both ratings. While it is possible to work for an aviation maintenance facility without these certificates, higher-paying employers like airlines look for A&P certificates when hiring.

The underlying value of the license and training needs to justify the cost and time to acquire them. Aviation Maintenance Technician (AMT) schools should be viable alternatives to the rising cost of a college education and lead to expansive careers. Pay rates from employers should allow workers to pay down student debt, or employers could subsidize the training. One program increasing in popularity is sponsorship. That's where companies "adopt" candidates in training and then find a spot for them, assuming completion of the program and a certain level of performance.

PAY AND HOURS

The [US Bureau of Labor Statistics reported](#) that mechanics earned a median annual wage of \$65,380, or about \$31.52 an hour, in May 2021. The median annual wage for avionics technicians — those maintaining and repairing an aircraft's electronics systems, such as radar, radio equipment, and navigation aids — was \$69,280. Those salaries are above the average worker's pay in the US by more than \$10,000 a year, based on BLS numbers.

Average entry-level hourly wages for mechanics are in the low \$20s an hour. It's likely the industry will push up salaries in response to the shortage. Higher wages might attract more young workers to the profession and prevent established mechanics from leaving for other jobs. But it's doubtful that the industry can make the shortage go away at least for the next few years by simply throwing money at it. Plus, there is also the problem of the resulting higher operating costs with which the industry would have to contend.

Adding to the challenge of attracting younger candidates, the job isn't one where hybrid work is possible, and the work schedule is not particularly flexible. Hybrid/flexible work has been cited in several studies, including one done by Oliver Wyman Forum, as an important factor for Generation Z applicants in job searches. Likewise, the work environment in hangars and repair stations or on airfields is often loud, or uncomfortably hot or cold based on the weather.

A LIMITED POOL

Looking at the workforce, most mechanics are male and white, although the number of women and minorities pursuing A&P licenses is rising, according to a 2021 report by the Aviation Technician Education Council (ATEC). Based on the latest data, [only 2.6% of certificated mechanics are women](#), according to the FAA. That's less than pilots, where 4.6% are women. Minorities are similarly underrepresented. Expanding the appeal of the profession to women and minorities would be one way to increase the pool of candidates from which MROs and airlines can draw.

One key to improving the outlook is engaging with prospective workers, getting them interested in aviation again. But in today's highly competitive climate, targeting high school and college students is probably too late. That education campaign needs to start early with programs that introduce both children and their parents to what's possible in aviation. This approach could reap rewards, given the cost of college and the fact that most parents are encouraging children to pursue careers related to science, technology, engineering, and math where better-paying jobs are more likely.

One easy group to approach would be current mechanics who are parents. Most children look at what their parents do for a living when considering a career for themselves, which might make them easier to convince.

KEEPING WORKERS ON THE JOB

Another effort that could help stem the shortfall is increasing retention rates among current workers. This might include later retirement or discouraging younger workers from leaving the profession for what they think might be greener pastures.

Four primary factors affect retention rates among aviation technicians: total rewards, pathways for growth, culture, and work environment. While it always helps to look for ways to raise hourly pay, it's also important to make sure pay progression and premiums are transparent and directly aligned with experience, tenure on the job, and a worker's responsibilities.

Technicians also need to see clear pathways for professional development. This means companies need to provide access to and maybe even subsidize technical training programs that give workers new skill sets and licenses to work on different aircraft types and technical specialties, such as avionics or composite materials. It also means opportunities beyond just developing technical skills. For instance, some mechanics may be interested in pursuing leadership roles, management and business courses, professional coaching, and mentorship programs.

For some independent MROs, it may be worth considering partnerships with mainline airlines for line or heavy maintenance jobs and using operator resources to raise MRO professional development offerings for their mechanics. Smaller MROs could leverage the training resources that the airlines have in their maintenance departments, which would benefit both the airlines and MROs as mechanics will likely move on to airlines or larger MROs anyway. But to make this kind of relationship work, smaller MROs need to modernize their human resources models and processes to cater to a younger and more transient workforce.

IN NEED OF MODERNIZING

This is where culture comes in. Diversifying the workforce and valuing diversity are steps in the right direction, given that Gen Z workers look for and expect diversified workforces. Gen Z workers are also apt to leave a work situation where they encounter unfair pay or uneven treatment based on race or gender.

The atmosphere at work is also important to these younger employees who work to live rather than live to work as their baby boomer elders did. Hence, the preponderance of ping-pong and foosball tables at companies with a lot of young workers — physical symbols of valuing work-life balance.

The MRO industry offers few of the amenities common at companies popular with Gen Z workers, such as free snacks, comfortable break rooms, and attractive work environments. Gen Z employees expect these extras when they come to work — especially since hybrid work situations are not available in MRO.

TRAINING 2.0

Another way to attract more mechanics is to improve the training process. The FAA could help the industry by making some rule changes that would modernize the sector. Revising 14 CFR Part 147, effective September 21, 2022, was a step in the right direction by removing archaic requirements from training. This was a much-needed overhaul to align curriculums with current industry standards.

But the change shouldn't stop there. The FAA and the industry could also consider ways to reduce the time mechanics spend in the academic environment through the expansion of on-the-job work study where candidates can work with A&P license holders.

Among additional changes that should be considered to ease pressures from the shortage are:

- Increase government subsidies and free tuition programs for AMT schools with requirements that students then owe a certain amount of time on the job in the United States or North America, like the military requirements for Reserve Officers' Training Corps candidates
- Allow candidates to apply credits earned in other trades with similar rigor, such as apprenticeship and journeyman programs in heating, ventilation, and air conditioning and plumbing, toward A&P certificates where appropriate
- Amend the rules that require 18 full months of 40-hour weeks to allow candidates that put in the same hours over a shorter period to qualify to take the A&P exam. Right now, the rule is somewhat inflexible
- Make it easier for military-trained and foreign aircraft mechanics to get certificated as A&P-licensed mechanics in the US and make work visas available to them

CUTTING-EDGE TECH

The Oliver Wyman Forum report called [The New People Shaping Our Future](#) showed that very few workers looking to upskill after COVID returned to traditional schools. They want a blended environment of in-class, online, and hands-on training. The MRO industry seems well-suited to provide that kind of experience.

Today's younger generation also grew up around technology, and they expect — and want — to utilize technology in their workplace, even for jobs that are hands-on. MRO training and operations must incorporate more modern technologies and experiences, not as experimental pilots but as business as usual. For instance, to ensure a unified industry focus on safety and reliability, training on the use of electronic logbooks, portable devices for work instructions, and hyperlinked content management systems should become standardized.

Going further, FAA-certified schools should introduce more cutting-edge technologies, such as artificial intelligence, augmented and virtual reality (AR and VR), and drones, into the curriculum to bring training into the 21st century.

This raises the bar on the skill set of mechanics and potentially their productivity. Adding the latest tech to training programs may enable more rapid adoption of it by the industry — leading to more productivity.

Aviation also must consider trying to attract workers in industries with similar skill sets and designing training that will enable them to cross over to aviation. This would mean increasing program offerings for mid-career workers to switch into aviation.

INVESTMENT IN PRODUCTIVITY

Given the impending shortage, maintenance organizations also need to focus on productivity more than ever. Are they making the most out of the scarce resources they have? There are tactical and structural changes that can be introduced to improve employee productivity, although companies must recognize the potential to scare away workers if they come down too hard.

The key is to make productivity programs more about improvements that make work easier or more satisfying rather than “turning the screws.” One way to make such efforts more successful is to offer opportunities for worker input so they feel ownership in the changes. The company may also benefit from the different perspective.

Tactically, maintenance organizations should be looking to eliminate waste through technology, such as clocking systems and barcoding and Lean efficiency-focused principles and practices. Structurally, it’s worth a company’s time to ensure that aircraft are not being over-maintained and thus wasting resources.

Using data to increase maintenance intervals is an obvious benefit to airlines, but it is also vitally important for all MRO providers when resources are so limited. In the same spirit, reviewing maintenance programs to ensure that modifications and maintenance tasks are generating value is also a way of making sure resources are being deployed most effectively.

Much of that work has been done over the last several years, but there are aspects that have not been incorporated to their full potential:

- Employ [Active Supervision](#) to assist workers and keep them on task
- Increase adoption of digital tools, such as portable devices. This requires adequate on-the-job training to demonstrate their most productive uses and how they can make their jobs easier through real-time data collection, error proof records, and other required documentation
- Share data up and down the supply chain to reduce technicians waiting on parts or materials and maximize a mechanic’s “time on tools” as a leading driver of labor inefficiency

CONCLUSION

For aviation's aftermarket, the labor shortage projections should make it clear that new approaches to attract and retain mechanics are needed. To accomplish that will mean pushing the MRO sector firmly into the 21st century through innovative talent practices, productivity, technologies, and values — especially if it wants to increase its appeal among Gen Z and millennial workers.

To deal with the immediate need, the focus must be on productivity: The MRO industry needs to be getting the most it can out of the limited number of mechanics it has. That means an increased emphasis on digitization, hand-held tech, and on-the-job training, as well as looking for ways to incorporate the newest tech.

Next, the industry must acknowledge the new labor landscape. It's no longer competing with only heavy industrial and manufacturing companies for young workers. It's going head-to-head with high-tech companies willing to offer higher pay, hybrid work situations, and better work-life balance.

To have a chance, MRO operations must focus on making entry-level mechanic slots more appealing by offering more competitive pay and benefit packages and an improved work-life balance. Employers must reduce barriers to entry with financial aid, work-study programs, and sponsorships — especially for underrepresented groups. By diversifying the workforce through active recruitment of women and minorities, employers will move the sector into the 21st century culturally and ease the squeeze on resources.

Recruiting must start earlier, at the middle school and high school levels through curriculum, internships, and scholarships. Simultaneously, there should be a dramatic expansion of sponsorships that help candidates get through training with less debt, placement opportunities, and future options to expand their skill base.

The younger generations like technology and want to be introduced to the latest like VR, AI, and drones. Airlines and independent MROs should encourage the FAA and other training programs to bring in this kind of cutting-edge tech to the classroom and should also be open to experiment in the workplace.

Mitigating the labor shortage may require companies to go a little outside their comfort zone and essentially establish a new working relationship with mechanics. We don't necessarily believe we will see the worst-case scenario and, in fact, expect the shortage to end up somewhere between our baseline and best-case. Our expectation is that the industry will increase wages to recruit and retain more workers. In addition, we have confidence the industry will also expand sponsorships and work harder to increase women and minority recruitment.

Still, numbers don't lie, and they portray an industry that needs to address its declining popularity among younger workers. Without some fundamental change, that trend may haunt the industry for more than just this decade.

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