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BY WAYNE ROSENKRANS

Inspector

Aviation safety inspectors fielded by some nations have problems complying with the standards and recommended practices (SARPs) of the International Civil Aviation Organization (ICAO). As inspectors face booming aviation system growth and increasing cross-border interdependence[1] — with their work redefined by forces ranging from globalization of aircraft maintenance to proliferation of safety management systems (SMSs) — auditors for ICAO continue to push for accelerated compliance through their Universal Safety Oversight Audit Program (USOAP).

Compliance deficiencies[2] found by the auditors appear in excerpts from ICAO contracting states' first-generation audits based on the USOAP's original auditing approach from 1999 to 2001, follow-up missions from 2001 to 2004, and post-2004 audits using ICAO's current comprehensive systems approach (*ASW*, 2/07, pp. 39-41). These excerpts are incomplete and anecdotal; they provide general insights about a specific time but do not show the extent of any deficiency involving inspectors, and many deficiencies are now resolved. By mid-2007, about half of the 190 ICAO states had authorized posting of the excerpts from their USOAP audit results

on a publicly accessible table in the Flight Safety Information Exchange (FSIX) area of the ICAO Web site <www.icao.int/fsix/auditrep1.cfm>. Of these states, excerpts from 10 audits reflect the comprehensive systems approach. Releasing current audit summaries becomes mandatory March 23, 2008. In brief, these reports show that ICAO wants civil aviation authorities to provide enforcement power and credentials to their inspectors, a competitive salary, enough inspectors for the workload, and training, procedures and tools that enable them to be effective and efficient.

Findings about inspectors typically were accepted by civil aviation authorities, the reports showed. But not always. In the Czech Republic, for example, the auditors found training deficiencies, but the civil aviation authority responded that because its flight inspectors formerly held flight crew licenses, had as many as 15,000 flight hours in air transport and received simulator training, they were "adequately competent to carry out en route checks, including planning, pre-flight inspection, in-flight inspection, post-flight inspection, etc., according to [the inspector's handbook]."

In several states, auditors found that inspection teams did not have a dangerous goods specialist. In others, there was no formal system for the civil aviation authority to send airworthiness information, such as malfunction reports, to manufacturers and other states.

Regarding Bulgaria, a favorable report said, "Under the current regulations, as reflected in their credentials, the aviation inspectors have the authority to propose the suspension, termination, revocation and limitation of the rights under the issued licenses, permissions, certificates and approvals, and to take immediate and independent action to address safety-critical findings."

Enforcement power without credentials — and credentials without power — are not acceptable situations, auditors say. Auditors visiting Estonia, for example, found that the credentials carried by inspectors did not confer upon them any legal power of access; right to inspect aircraft, facilities, manuals, certificates, licenses or files; power to detain an aircraft; or — for just cause — authority to immediately prevent an aviation professional from exercising the privileges of a license or certificate. A similar report for Hungary said that this gap caused "difficulty ensuring compliance with aviation laws and regulations due to this lack of empowerment [and] few examples of enforcement actions taken by the [civil aviation authority]."

The opposite was found in other states; for example, the inspectors in the Marshall Islands were "fully empowered [but] not issued a government credential to identify their [official duties and] authority." The airworthiness inspector had,

Scrutiny

ICAO auditors expect states to commit enough resources for effective oversight.

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Authoritative Credentials

The enforcement power represented by an aviation safety inspector's badge and/or other credentials played a critical role in effective safety oversight, according to some of the reports. Inspectors in some states had neither a badge nor other credentials, however. When provided, some credentials were inconsistent in their purpose.

instead of a government credential, only an airport identification card granting access to airport property. Some civil aviation authorities, such as in Sweden, initially objected to these findings, however, arguing that such amendments were unnecessary because no inspector in the past had been denied access.

Exercising authority also implies clear definition of inspectors' privileges and ready access by inspectors to domestic aircraft, foreign aircraft, operator buildings/installations, air traffic organizations, airports, maintenance and repair organizations, training institutions, paper documents and digital data. Auditors' follow-up comments were favorable when Bulgaria not only spelled out how inspectors can initiate statements for administrative violations but formally documented the authority of inspectors to issue written guidelines for corrective actions by operators or other organizations.

At the civil aviation authority in Moldova, auditors found that monetary penalties and imprisonment could be imposed by law for violation of aviation regulations. Records showed only that aircraft had been grounded and certificates had been suspended temporarily. Yet no enforcement methods less severe than these four sanctions were in place for situations in which inspectors routinely identified a safety discrepancy and simply wanted a timely correction.

Inspectors' oversight of designated examiners, line check pilots and contractors also involved deficiencies. The main issues were insufficient random checks of certificate candidates and insufficient quality control of testing procedures, leading to entirely "self-monitoring by the air operators."

Government-issued vehicles and credentials that confer rights of access are considered essential for all aviation safety inspectors.

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Competitive Salaries

Low inspector salaries is one theme echoing through a number of reports. Auditors focused on the safety-related consequences, such as chronically unfilled positions, high turnover of inspectors, oversight delays or backlogs caused by the shortage of inspectors, difficulty attracting highly qualified professionals from industry, insufficient travel funds for inspection/training missions and inability to schedule inspector training, especially recurrent training on the aircraft types operated under the state's air operator certificates (AOCs).

Related issues were the civil aviation authority's ability to provide stable long-term employment and whether the ministry of transportation arbitrarily established inspectors' salaries. "[Senior operations and airworthiness inspectors] are on a yearly renewable contract due to government policy, and no provision is available to reinforce the technical capacity of the [civil aviation authority] by offering them long-term contracts," said a report on Lesotho. A report on the Czech Republic noted, "[Inspectors' classification under civil servant law] means that their salary can reach, on average, a maximum of one-third of the salary of qualified line pilots [of an] air company."

Poland's civil aviation authority said that recent operations inspector vacancies had been filled by pilots retired from the state airline industry. Hiring was difficult due to "low inspector salaries which remain approximately one-tenth of those provided to similarly qualified people in industry."

Sometimes, the civil aviation authority's response was to deny that low salary was a safety concern. The civil aviation authority in the Netherlands told ICAO, "This has no direct impact on the recruitment of flight operations inspectors [or] on existing competency and experience among the team of inspectors for the

present level of activity of the [civil aviation authority]. The government has already launched a study which will allow additional compensation for the entire organization." In some cases, however, the ICAO follow-up mission found that as soon as the civil aviation authority increased salaries, inspector turnover ceased to be a problem.

The solution in Poland was for the minister of transport to index the inspector salary scale to a maximum of 80 percent of the salary received in comparable positions in the industry, and to amend a law to "require maintenance of inspector salaries at that level."

Sufficient Staffing

Low salary sometimes led to insufficient inspector staffing, which some auditors simply called "too much workload." In response to this finding, the civil aviation authority of Ireland held on to its belief that it employed a satisfactory number of inspectors but agreed to add inspectors to reduce dependence on external contractors.

In Switzerland, the safety consequence of an acute shortage of operations inspectors was that "subsequent to the issue of an [AOC], only a few operations inspections on some commercial air transport operators are conducted." Some civil aviation authorities — such as in Singapore — responded to such findings by refining the workload parameters and formulas they use to calculate the required number of flight operations inspectors.

Other auditors identified failures by civil aviation authorities to meet their own schedules of en route flight deck/cabin inspections and station inspections for scheduled air operators. "Neither the state regulations nor the [inspector's] handbook [specifies] the minimum number of inspections that should be performed for each operator during the year," said a report on Poland. "Inspections are planned according to the manpower presently available. Due to this lack of regulations and the shortage of operations inspectors, the division is accomplishing less than the minimum number of inspections recommended by ICAO guidance material." In Oman, the civil aviation authority's audit plan

"indicated that most of the scheduled audits have not been performed due to a shortage of flight operations [inspectors] and airworthiness/maintenance inspectors."

Civil aviation authorities of various sizes reported difficulty enabling operations inspectors, as a group, to stay current as pilots on all aircraft types flown by the state's AOC holders. A report about the civil aviation authority in Finland said, "Although the [civil aviation authority] tries to have all the aircraft expertise within its own staff, it also has to use the expertise of [designated] company check pilots to complement its capabilities and to conduct type-specific inspections not covered by its inspector work force. … [The civil aviation authority's] inspectors perform all operations system inspections, route checks covering non-type-specific elements, [operators' crew] training and ramp inspections. They also review the work done by the designated check pilots."

Acute shortages of inspectors in some countries have limited inspections of air carriers.

The civil aviation authority in Denmark said, addressing a related audit finding, that "it would not be physically possible for the relatively few inspectors employed by a small unit … to be qualified and current in each aircraft type used by the … operators." The solution was a commitment by the civil aviation authority to adhere to SARPs and Joint Aviation Authorities procedures "as far as possible" and to "use adequately qualified and authorized line check commanders,

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acceptable to [the civil aviation authority], for specific type-related checks. … The minimum experience requirements, which are identical for [civil aviation authority] inspectors and designated check pilots, are mandated by regulation."

In Hungary, agreements with airlines enabled operations inspectors to fly a minimum of 200 hours per year as line pilots. But ICAO auditors also found that this arrangement required the inspectors to be absent from their inspection duties for long periods of time. The operations inspectors in Switzerland were authorized to maintain currency in their pilot ratings within the industry by flying 20 percent of their working hours.

Procedures, Checklists and Training

Deficiencies in establishing proper procedures for inspectors were prominent in reports about some states. Auditors' concerns about checklists also generated findings, such as: inspector checklists that were not comprehensive; inspectors conducting inspections without any checklists; and use of unapproved checklists or job aids.

Some of the most comprehensive inspector training programs found by auditors comprised initial indoctrination, on-the-job training, recurrent training, a pilot currency system, advanced courses and detailed files of inspector training. Absence of such files was noted for a number of civil aviation authorities, however.

ICAO auditors also questioned the appropriateness of civil aviation authorities taking cues from operators on when to conduct inspections. "In practice, inspections are conducted on an irregular basis or when requested by the industry," said a report about Bahrain. "Any deficiencies identified during an inspection are handled informally." This civil aviation authority could not produce acceptable evidence of the inspections, deficiencies or follow-up actions under this system.

Tools of the Trade

Deficiencies in office facilities and equipment also affected inspectors. For example, findings in the Marshall Islands were addressed by purchasing a photocopier, microfiche and microfilm reader, mobile telephones, a laptop computer and a government vehicle for surveillance and on-site inspections. In other states, the inspectors lacked long-distance telephone service, Internet access, facsimile equipment, slope and distance measuring equipment and photo/video cameras.

ICAO auditors also found, however, that a civil aviation authority's acquisition of computer hardware, software and Internet access by itself did not translate into adequate access to, or control of, essential technical materials. They favored a dedicated technical library — digital, paper or both — to quickly access material such as mandatory continuing airworthiness information, master minimum equipment lists and manufacturers' technical publications.

The civil aviation authority of Iceland told ICAO that it "does not require nor have the necessary means or resources to obtain, store and maintain current, technical documentation as detailed in the [audit] recommendation, except when design organizations can provide that data in digital format." Instead, its practice was for inspectors to obtain information from an external organization — such as an aircraft operator or maintenance and repair organization — that is required by law to maintain updated documentation.

The traditional method of airworthiness surveillance, sometimes called "100 percent checking," is being abandoned by some civil aviation authorities — with the endorsement of ICAO and other international safety specialists — in favor of SMSs. For example, noting the current environment of inspectors, a USOAP audit report for Bulgaria said, "The regulatory staff rely extensively on prescriptive checklist methodology and have not yet embraced and introduced the broader regulatory audit regime,

and concepts such as SMS, including risk assessment."

Top-Flight Practices

USOAP audits also furnish insights about best practices and innovations. For example, the civil aviation authority's inspection-activity database in Bulgaria consolidated "all the data, checklists and photographs collected by the inspectors during their audits and inspections, all aircraft and maintenance records, status of life-limited parts, checklists relating to renewals of certificates of airworthiness, and records of certificates issued."

The civil aviation authority in Finland based its inspector training plan on one-year, three-year and five-year forecasts and factored in regionwide inspector training requirements. The authority in the Czech Republic applied software to automate its process of requesting a corrective action plan from an operator, monitoring implementation and prompting inspectors to ensure that every corrective action item is cleared.

In Canada, the civil aviation authority built incentives for commercial aircraft operators into continuous airworthiness surveillance through a national program. "The certificate of airworthiness remains valid as long as all airworthiness requirements are fulfilled and an annual airworthiness information report is completed and signed by the owner or an authorized delegated person and submitted," the report said. "The audit is conducted within intervals of six to 36 months, covering all large commercial air transport operators and maintenance organizations and manufacturers as well as any approval holder … targeted as high risk. The [program] also includes a follow-up of the findings identified during the audit, which are required to be [cleared] in the following two years."

The civil aviation authority in the United Kingdom committed to a fully digital solution for its own documents, introducing an Internet-based format for its inspector's manual with accessibility to all staff. "No hard [printed] copies (except for a master copy) have been published," the report said.

The civil aviation authority in Australia described to auditors how its conventional inspection processes had been superseded by a "system safety analysis approach" backed by comprehensive training for flight operations inspectors.

"The [civil aviation authority currently] relies on a system where the prime responsibility for airworthy aircraft remains with the owner-operator," a report about Sweden said. "Aircraft certificates of airworthiness are renewed based on declarations from maintenance organizations in conjunction with random inspections, including spot-checking of [airworthiness directives]."

As such shifts of responsibility to operators occur under SMSs, the traditional inspector role in some cases can expand to include on-site participation in risk analysis conducted by the operator. As a result, a new type of audit finding under ICAO's comprehensive systems approach has emerged. Auditors who assessed Bulgaria, for example, said, "[Inspectors] are not participating in the periodic meetings of air operators, during which the effectiveness of their reliability programs is monitored. Consequently, the inspectors are not informed of any degraded levels of safety to justify any decision taken, [or] to initiate or impose special operational restrictions." ●

Notes

1. Scovel, Calvin L. III. "Aviation Safety: FAA Oversight of Foreign Repair Stations." Testimony of the inspector general of the U.S. Department of Transportation before the Committee on Commerce, Science and Transportation; Subcommittee on Aviation Operations, Safety and Security; U.S. Senate. June 20, 2007. This document describes changes occurring worldwide in the role of aviation safety inspectors, including the effects of conducting maintenance of large commercial jets outside their country of registry and the introduction of safety management systems within civil aviation authorities.

2. When auditors from the Universal Safety Oversight Audit Program of the International Civil Aviation Organization identified inspector-related deficiencies within civil aviation authorities, they typically referred to standards and recommended practices cited in Document 8335, *Manual of Procedures for Operations Inspection, Certification and Continued Surveillance,* and Document 9734, *Safety Oversight Manual, Part A — The Establishment and Management of a State's Safety Oversight System.*