121 North Henry Street
Alexandria, VA 22314-2903
T: 703 739 9543 F: 703 739 9488
arsa@arsa.org www.arsa.org

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Sent Via: E-mail:
9AWAAVSDraftAC2193@faa.gov

Sarbhpreet S Sawhney
Aircraft Certification Service
Aircraft Engineering Division
Certification Procedures Branch, AIR-110
950 L'Enfant Plaza, SW 5th Floor
Washington, DC 20024

RE: Draft AC 21.93-1, titled “Determining the Classification of a Change to Type Design”

Dear Mr. Sawhney,

The Aeronautical Repair Station Association (ARSA) respectfully requests consideration of its following comments to draft Advisory Circular (AC) 21.93-1.

ARSA is the principal association for the international aviation maintenance industry. Established in 1984, our members include aircraft operators and aviation maintenance facilities in locations around the world. As such, its members are directly impacted by the “guidance” contained in the AC.

We appreciate FAA’s effort to clarify changes to type design, however the positions taken in the draft AC conflict with the existing rules. Although, we suggest several specific changes in this letter, we are unable to fully address the draft as written, since the conceptual differences between the draft and the rules forms the basis of the proposed AC. Our comments, and suggested changes, are aimed at the statements and content we feel are at the root of the disconnection.

Since this is such an important topic, which affects many segments of the industry, we request that the FAA reconsider the draft AC. In its place, we suggest that FAA consult with industry groups, such as ARSA, in a cooperative effort to create guidance to 14 CFR § 21.93.

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Chapter 1

The introduction to the draft AC is disconnected from the regulatory basis for considering a change to type design – the type design itself.

Instead, paragraph 4(b) briefly mentions type design as part of the type certificate (TC). As a result, focus is shifted away from the proper subject - type design - when it should be at the heart of the analysis.

Type design is a discrete element in 14 CFR part 21, subpart B.[1] Since the aim of 14 CFR § 21.93 and therefore the draft AC, is to classify changes in type design, it follows that a narrow focus must be applied.

The draft AC, in chapter 1, paragraph 4(b) presently states that:

> When we find that a product is properly designed and manufactured, complies with the applicable airworthiness standards, we issue a design approval in the form of a TC. A TC, as defined in 14 CFR § 21.41, includes the type design, the type certificate data sheet and any limitations established for the product by the FAA. This ensures the product complies with the certification basis of the type certificate.

We suggest the following revision:

> When we find that a product is properly designed and manufactured, complies with the applicable airworthiness standards, we issue a design approval in the form of a TC. A TC, as defined in 14 CFR § 21.41, includes the type design, the type certificate data sheet and any limitations established for the product by the FAA. ~~This ensures the product complies with the certification basis of the type certificate.~~ **14 CFR §**

[1] 14 CFR § 21.31 Type Design
The type design consists of—
(a) The drawings and specifications, and a listing of those drawings and specifications, necessary to define the configuration and the design features of the product shown to comply with the requirements of that part of this subchapter applicable to the product;
(b) Information on dimensions, materials, and processes necessary to define the structural strength of the product;
(c) The Airworthiness Limitations section of the Instructions for Continued Airworthiness as required by parts 23, 25, 26, 27, 29, 31, 33 and 35 of this subchapter, or as otherwise required by the Administrator; and as specified in the applicable airworthiness criteria for special classes of aircraft defined in §21.17(b); and
(d) For primary category aircraft, if desired, a special inspection and preventive maintenance program designed to be accomplished by an appropriately rated and trained pilot-owner.
(e) Any other data necessary to allow, by comparison, the determination of the airworthiness, noise characteristics, fuel venting, and exhaust emissions (where applicable) of later products of the same type.

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> **21.31 defines type design as the drawings and specifications necessary to define the configuration and design features of the product shown to comply with certification requirements, which includes information on dimensions, materials, and processes necessary to define the structural strength of the product.**

Although our concerns are much deeper than this simple addition to an introductory paragraph, we feel the issues are rooted in the missing association with the applicable rules.

Chapter 2

The goal of the “system safety approach” introduced in chapter 2 is admirable in that it attempts to optimize safety. However, this chapter diverts the focus away from existing rules.

Specifically, paragraph 3(d) of chapter 2 misreads the rule. It states that:

> 14 CFR § 21.93 (a) requires that we consider appreciable effect on characteristics affecting airworthiness. It should be noted that the regulatory language does not just stop at considering the appreciable effect on the weight, balance, structural strength, reliability, operational characteristics, or other characteristics but continues on to define these characteristics as those that affect the airworthiness of the product. Therefore, an appreciable effect’s final impact on the airworthiness of the product is what determines if the change is major or minor. The ultimate objective being the safety of the product. *(Emphasis added)*

For comparison, the relevant regulatory language states that:

> A “minor change” is one that has no appreciable effect on the weight, balance, structural strength, reliability, operational characteristics, or other characteristics affecting the airworthiness of the product. All other changes are “major changes”…

Clearly the rule states that the weight, balance, structural strength, reliability, operational characteristics or other characteristics *are the* characteristics affecting airworthiness. The impact of *the change* must be evaluated for its appreciable effect on those elements and thus the product.

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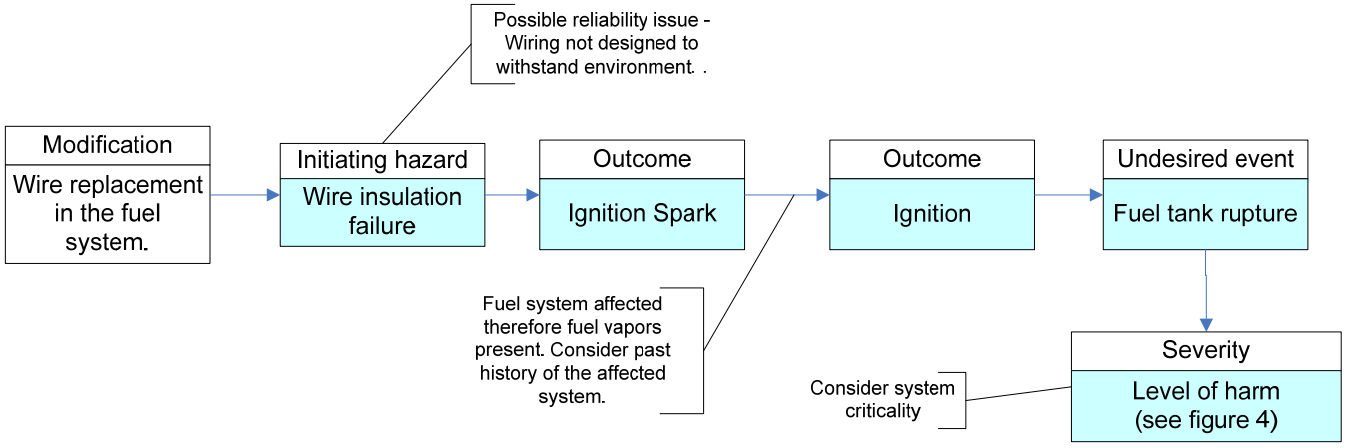
Stated slightly differently for clarification, the characteristics listed in the rule are those that materially contribute to the certification level of safety of the product.

Instead of analysis contemplated by the rule, the result of the paragraph 3(d) interpretation, cited above, is ultimately a concentration on the potential risk inherent *in the original design* instead of the change to that design. Such an outcome is illustrated in chapter 3, Figure 3 of the draft AC, reproduced below:



The illustration, above, is clearly focused on the original design, and not the change to that design as required by the rule.

Under this example, it would appear that substituting a heavier gauge wire, covered with the same insulation material, in the fuel system wire replacement is automatically assessed as a major change. No consideration is given to the appreciable effect on the airworthiness of the product that results from installing the thicker wire.

Chapter 3

This chapter is rife with the notion that *any* change, no matter how slight, to certain items will inevitably result in a determination of a major change to type design.

Unfortunately, the bright-line determinations of major and minor changes contained in Figure 4 of the draft AC are at odds with the existing rule.

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Figure 4:

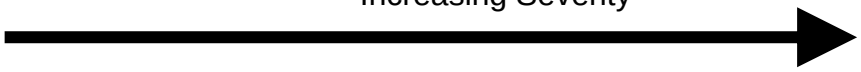
Severity level determination:

This chart describes the severity levels that may be assigned to identified undesired events (failure conditions) at the product level. Use the criticality of the affected system to determine the appropriate severity level for an identified undesired event (failure condition) at the product level.

Level 1	Level 2	Level 3	Level 4	Level 5
Failure will have LITTLE to NO effect on continued safe flight and other operational phases.	Failure will not prevent continued safe flight and landing; however, resulting consequences MAY reduce the capability of the aircraft or the ability of the crew to cope with adverse operating conditions or subsequent failures.	Failure will not prevent continued safe flight and landing; however, resulting consequences WILL reduce the capability of the aircraft or the ability of the crew to cope with adverse operating conditions or subsequent failures.	Failure MAY prevent continued safe flight and landing. Resulting consequences MAY reduce safety margins, degrade performance, or cause loss of capability to conduct certain flight and/or passenger safety operations	Failure WILL prevent continued safe operation. Resulting consequences WILL reduce safety margins, degrade performance, or cause loss of capability to conduct certain flight and/or passenger safety operations.

Green - Low **Yellow - Medium** **Red - High**

Increasing Severity



Instead of focusing on the elements of the rule, Figure 4 introduces separate concepts of continued safe flight and landing, degraded performance, reduced safety margins and the inability of the flight crew to cope with adverse operating conditions or subsequent failures, as the principal elements in analyzing any change to type design. These elements are equated with appreciable effects, as stated in paragraph 3(f), which provides, in part, that:

> Determine type design change classification – The classification of major or minor is assigned based on the assessed severity levels. The system

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> safety assessment process concludes with a severity level for each undesired event. This severity level determination is a measure of the appreciable effect stated in 14 CFR § 21.93 and therefore there is a direct correlation made between these two terms in this AC. Based on Figure 4, if at any point in this assessment a severity level of 4 or 5 is identified, then the subject change is a major change to type design and no further assessment of any remaining identified hazards is required. *(Emphasis added)*

Under that new rationale any change to certain items will automatically result in “major change” determinations, no matter how slight the change in type design.

The fundamental elements of the analysis in the draft AC are based entirely upon the original design, without regard for the appreciable effect of the design change, as required by the rule.

Conclusion

We respectfully ask the FAA to reconsider the draft AC, in favor of a complete revision that is developed based upon the plain language of the regulation in consultation with industry group memberships impacted by the guidance.

Additionally, this guidance must be coordinated among and between the numerous other ACs that deal with the supplemental type certification process, the changed product rule and the field approval process. Issuing the draft AC (as proposed) would create diverse and contradictory guidance to the FAA’s employees and the public.

ARSA would spearhead an effort to coordinate this activity with the FAA.

Respectfully submitted,

Craig L. Fabian
Associate Counsel