

**COMMENT RESPONSE DOCUMENT**  
**Diamond DA40, Special Condition Banner Towing , CRI O-03**

PARAGRAPH COMMENTED	COMMENT / PROPOSAL	AUTHOR OF THE COMMENT	DATE OF COMMENT	PCM RESPONSE
B3 Climb	<p>The speed to be used in the determination of compliance with the proposed climb rate (1.5m/s at 450m at ISA+20°C) should be specified.</p> <p>Compliance with CS 23.71 (Glide (Single-engined aeroplanes)) with the banner attached should also be required.</p> <p>It is further suggested that the operating performance ceiling with banner attached should be determined and scheduled. For operations at high altitude locations, e.g. ski resorts, the ability to operate at or above MSA is important and needs to be assessed upon the aircraft's performance in the towing configuration. Therefore, it is suggested that the rate of climb at the ceiling should be not less than 46m/min.</p>	CAA-UK		<p>Accepted, With speed of 23.63 added</p> <p>Not agreed, In case of an engine failure, the banner will be dropped and the airplane glide conditions apply. It make no sense to include this data.</p> <p>Not agreed Banner Towing is normally a low level Operation. The Climb rate requirement of B3 does require a higher standard as in CS23, above MSA. The Climb performance is required in G4 to be a part of the AFMS.</p>
B4 Tow Speeds	<p>For maximum tow speed a choice is given, but in case of a difference it is not clear which of the two choices takes precedence. Any doubt could be eliminated if the words "whichever is lower" were added. Thus the sentence would become: "<i>Maximum tow speed must not be higher than Va, or the limitations of the banner, whichever is lower</i>".</p>	CAA-UK		Agree revised
B5	31 accidents investigated by NTSB (see	CAA-UK		

<p>Controllability and Manoeuvrability</p>	<p>comment to paragraph G3(f)) were precipitated by loss of engine power. 20% of these involved an in flight loss of control. It is suggested that consideration be given to including an evaluation of controllability for the complete tow formation in power off conditions.</p> <p>Furthermore, acceptable elevator control force characteristics in manoeuvres would still seem to be an important part of the assessment of the aircraft in the towing configuration. Similarly, a demonstration of satisfactory characteristics during sideslips is also important, particularly for the pick-up manoeuvre. These two conditions should be addressed during certification and thus we would recommend they be removed from paragraph B5 of the CRI.</p>			<p>Agree partly, This was in general the intent of the SC, to include this failure conditions. It should be considered, that In case of an engine failure, the banner will be dropped and the airplane glide conditions apply. The time period will be short for this condition, so I accept to remove sideslip, but Power off should be included, because Idle Power test are required, which is a conservative Condition due to the additional propeller drag.</p>
<p>B6 Stall warning</p>	<p>It is not clear what "adequate" and "compared to the basic requirement" mean in the context of this paragraph. For improved clarity it is suggested that this requirement could be written in generic form as follows: "<i>The stall warning requirements referenced in the aircraft's Type Certificate must be met in each banner tow condition</i>".</p>	<p>CAA-UK</p>		<p>Accepted and changed</p>
<p>B7 Tow cable release</p>	<p>The term "<i>tow plane</i>" is not in common usage. The term "<i>towing aircraft</i>" is preferred.</p> <p>This paragraph refers to "the speeds of B3". Should this be a reference to B4, which is the paragraph that addresses tow speeds?</p>	<p>CAA-UK</p>		<p>Accepted, changed B4 changed</p>
<p>C1 Proof of structure</p>	<p>It is not clear what "from the base requirement" means in the context of this paragraph. For improved clarity it is suggested that this requirement could be</p>	<p>CAA-UK</p>		<p>Accepted, Type Certificate changed to Type Certification Basis</p>

		written in generic form as follows: <i>"Compliance with the Strength and Deformation, Structural Analysis and Load Test requirements referenced in the aircraft's Type Certificate must be shown for the banner tow condition and installation".</i>			
C2(c) Loads	Towing	<p>None of the load conditions are presented as a whole aeroplane case, the only specific case being C3, "strength of launching hook attachment", which applies only to the hook attachment structure.</p> <p>No allowance for weak link variability is included. BCAR K4-11 para 3.1 applied a factor of 1.2 to cover this and a similar value would seem appropriate here. The only reference to a 1.2 factor in the proposal is applied to snatch loads during pick-up. This factor should be independent of the type of rope used as it represents a practical worst case scenario if (for example) the banner should snag on pick-up.</p> <p>To address these issues sub para C2 (c) should be replaced with <i>"The aeroplane, the tow hook installation and its attachments must be designed for the conditions of C2 (a) under a minimum tow load of at least 1.2 Qnom."</i></p>	CAA-UK		<p>In General it is agreed that it is not clear that it should cover the whole airplane. The current text in C2(c) describe in a better way the actual conditions which have to be addressed by the structural analysis, but it is technically identical..</p> <p>Text changed to <i>"The aeroplane, the tow hook installation and its attachments must be designed for a ..."</i></p>
C3		This refers to a "launching hook attachment". It is unclear whether this means the towing hook referred to elsewhere, or if this is a reference to a release latch.	CAA-UK		<p>The launching hook is the complete assembly, including the latch and mechanism and is attached to the fuselage structure</p> <p>(complete assembly) added</p>
D1	Cable systems	It is not clear what is meant by " the basic requirement of the towing plane". For improved clarity it is suggested that this requirement could be written in generic form	CAA-UK		<p>Accepted Type Certificate changed to Type Certification Basis</p>

	as follows: " <i>Each cable system installed with the tow installation must comply with the relevant requirements referenced in the aircraft's Type Certificate and with this CRI</i> ".			
D2 (c) Release Mechanisms	No JAR 23 paragraph number is specified and in any case it is not believed that there is a relevant value for acceptable release force specified in JAR 23. It is recommended that the values specified in BCAR Section K, Paper K806, Banner Towing be used which are that the force shall be between 20 and 130 N.	CAA-UK		The maximum pilot force for stick operation in 23.397 is 300N The maximum pilot force for tow cable release in 22.397 is 350 N It is reasonable (human issue) that the loads of cs22 are applicable also for the banner tow. A Minimum Value prevents the inadvertent Operation.  20 to 350N added
D3 Colour marking and arrangement of cockpit controls	It is not clear whether the towing cable release must be yellow and red or yellow or red. It is recommended that the BCAR Section K Paper approach be taken and the release must be a yellow colour.	CAA-UK		The cable release handle for the tow release is the same for banner and glider towing. During Operations the release is in Normal Operation and for Emergency Operations. The release handle for normal operation is Yellow, coming from CS22.780, for emergency operations the handle has to be red. This Issue was highly discussed during SC development and finally it was agreed to mark it red/ yellow. Meaning an Yellow and Red alternating marking,  Text amended
E3 Cooling test procedure for reciprocating engines	It is not clear what is meant by " base requirement for the tow plane". For improved clarity it is suggested that this requirement could be written in generic form as follows: " <i>The cooling test procedures referenced in the aircraft's Type Certificate must be carried out with the critical speeds and power settings for the banner tow formation established in Section B of this CRI. The most critical engine temperature must be determined</i> ".			Accepted  Type Certificate changed to Type Certification Basis
F2 Miscellaneous	For clarity, it is recommended that this sentence be re-written to read: " <i>The type of</i>	CAA-UK		Accepted and changed

equipment	<i>pick-up hook is a part of the tow rope and must be established</i> <b>defined as part of the design definition".</b>			
G2 Operating Limitations	Sub-paragraph (h) refers to "Maximum number of occupants in Tow". Is this intended to define the maximum occupants in the towing aircraft? Note that allowance must be made for role training and checking of pilots	CAA-UK		Not accepted, The content of the SC covers the technical changes only and not the relevant Operating Issue. If Nationally due to Operational Requirements Occupants only allowed for training and checking of pilots it must be covered by the Operating rule for banner towing.
G3 (f)	<p>In 1998 the United States NTSB reviewed 145 banner towing accidents occurring over the previous 15 years, including 37 fatalities and 11 serious injuries. This was summarised in a report dated July 21, 1998, including Safety Recommendations A-98-59 through -61. Aside from pilot training issues, many accidents involved entangled or snarled banner tow lines. Typically this happens when the pick-up hook and tow line are manually deployed by the pilot in flight.</p> <p>UK CAA, since 1990, always required the tow line to be fed forward and the pick-up hook stowed in an approved release latch in readiness for in-flight deployment. It is suggested that such an arrangement should be a normal requirement to facilitate a safe procedure, needed under paragraph G3 (f) and it is strongly recommended that more detailed design and operating requirements are included in the CRI for this aspect of banner towing. BCAR Section K contains some requirements for pick-up hooks (grapnels).</p>	CAA-UK		<p>Fully accepted, This is the intent of Item G3(f), but the procedures have changed since that time and we have systems with a "rolling banner" that do not require a hook any more.</p> <p>"if necessary" changed to " if a pick up hook is installed" and Item D5 added</p>

- 1) PAD / DOC PARAGRAPH COMMENTED: The author of the comment will identify the paragraph of the PAD or any other documents referred in it (Service Bulletins, Service information Letters, Telex, Aircraft Manuals, etc) that is commented.
- 2) COMMENT / PROPOSAL: The comment will be inserted with a proposal.
- 3) AUTHOR OF THE COMMENT: The name of the Author.
- 4) DATE OF COMMENT: The date the comment is received by EASA.
- 5) PCM RESPONSE: The PCM response, expressing agreement/disagreement with the comment. The PCM will indicate if as a result of the comment, the PAD will be modified.