# AC75 Request for Interpretation 017

of

# AC75 Class Rule Version 1.2 issued 10th December 2018

Rule References:

12.9 Apart from permitted movement of **foils**, **foil arm drums** and **control surfaces**, parts of the **yacht** shall only move or be moved:

(a) to control movement of a **control surface**;
(b) in preparation of controlling a **control surface** (e.g. setting a **headsail** car prior to hoisting; turning an unloaded winch to check it is connected to a drive train; charging an accumulator);
(c) to organise rigging or deck gear after controlling a **control surface** (e.g. stowing sheets; stowing a winch handle; zipping closed a sail cover);
(d) within the **FCS**;
(e) to open or close access panels (which must not be into the **hull**);
(f) as part of a drainage flap permitted by Rule 11.17;
(g) as part of a simple mechanical wind indicator that has no purpose other than indicating the apparent wind direction;

21.2 No **control system** or part thereof shall be capable of using feedback from the **yacht state** to control a **control surface**, except:

(a) motion of a **control function** may be restricted where permitted by Rule 21.3;
(b) one or more **force input devices** may be connected **mechanically** and/or through an **HCC** to a single **control surface**; forces acting on that **control surface** can only be transmitted to those **force input devices**;
(c) one or more **force input devices** may be connected **mechanically** and/or through an **HCC** to common mechanical drive trains or common pressure supply lines that provide power to multiple **control surfaces**; forces acting on those **control surfaces** can be transmitted through those mechanical drive trains or pressure supply lines to those **force input devices**;
(d) as permitted within an **HCC** by Rules 22.5 (d) and 22.5 (e);
(e) as permitted within an **ECC** by Rule 24; and
(f) a **control surface** can move passively as the result of **external forces** acting on that **control surface**, providing the above Rules are respected;
(g) within electrical systems (e.g. a cooling fan, a bilge pump or a wind wand); or
(h) for safety reasons.

21.3 A **control system** may restrict a **control function** as follows:

(a) fixed stops, or stops engaged and disengaged **mechanically**, may limit the travel of a **control function**;
(b) locks that engage **mechanically** at (or very nearly at) either end of the extent of motion of a **control function** may be disengaged by an **ECC** and/or **HCC**, providing those extents of motion are not adjustable; and
(c) locks that engage **mechanically** at (or very nearly at) either end of the extent of motion of a **control function** may be disengaged by an **ECC** and/or **HCC**, providing those extents of motion are not adjustable; and

(d) locks that limit the direction of motion of a **control function** at discrete points, e.g. ratchets, may engage **mechanically**.

However, stops and locks permitted herein shall not be combined to provide greater control of a **control function**, and shall not be used in mechanisms such as, but not limited to, escapements, to achieve the effect of indexed control or position control.

Background:

Consider the following **control system** (Figure 1):

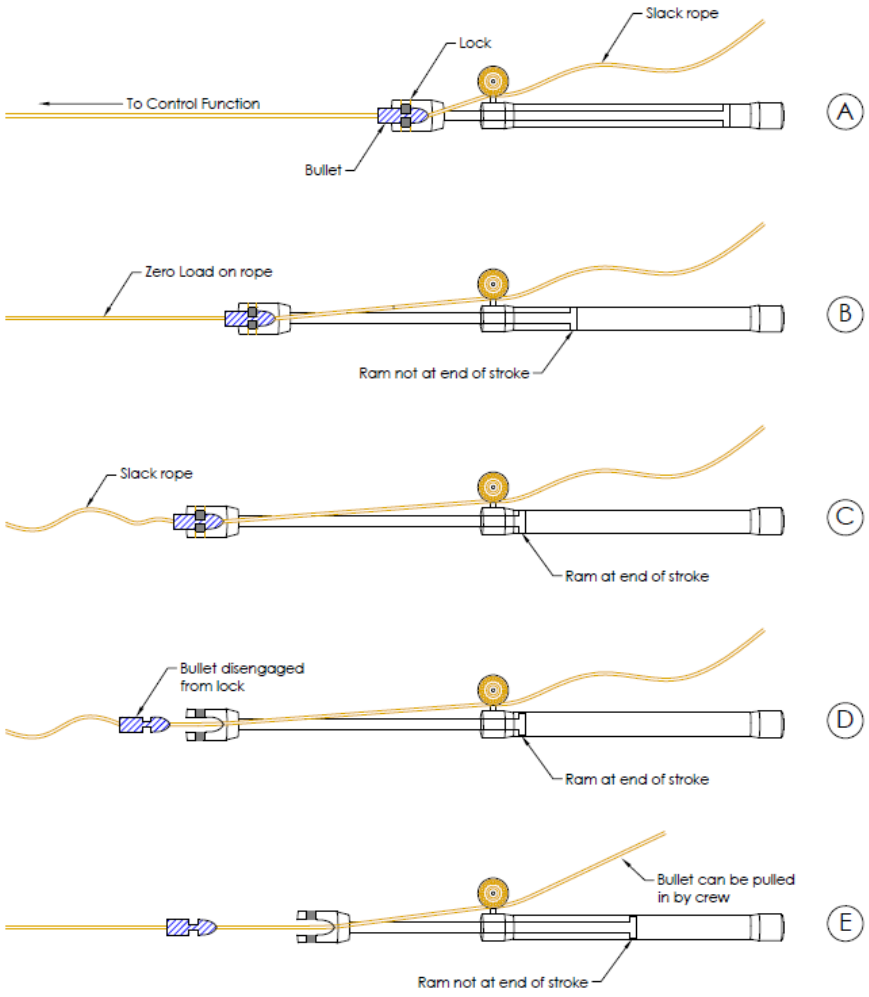


Figure 1 shows the system in various positions/configurations. The rope to the left of the bullet may be either:

- slack, in which case, the rope to the right of the bullet can be pulled to organise rigging; or
- taut, in which case it is connected to a **control function**, and the rope to the right of the bullet can be pulled to adjust that control function.

The bullet can engage with a lock on the end of the spear of a ram so that when the bullet is engaged the **control function** can be adjusted by the ram through a portion of the stroke of the ram. The rope that the bullet is on passes through the lock so that when the lock is not engaged the rope can be adjusted by the crew by hand.

A typical example of such a system would be a hydraulic runner system with a lock that can be released to manage slack line and prevent the runner fouling the **mainsail**.

Figure 1A shows the ram in a position where it can adjust the **control function**.

Figure 1B shows the ram in a position where the maximum extent of motion of the **control function** is reached.

Figure 1C shows the ram at the end of its stroke. The rope to the **control function** is slack and the bullet still engaged in the lock. The **control system** has had no influence on the **control function** between the ram positions shown in B and C.

Figure 1D shows the bullet released from the lock to allow the rope to be free to move.

Figure 1E shows the bullet released from the lock and the ram retracted into a position where the rope would be taut if the crew pulled the rope into a position where the bullet hit the lock. In this scenario the **control system** would act upon the **control function** before the bullet hits the lock.

Questions:

Firstly, considering easing the **control system** and disengaging the lock:

1. Would the **control system** infringe the last paragraph of rule 21.3 by providing indexed control of the **control function** if the ram is eased to its end stroke and the bullet subsequently disengaged, but it is not possible for the rope to be taut when the ram reaches the end of its stroke?
2. Would the **control system** described infringe either or both of rules 21.2 or 21.3 if it is possible for the rope to be taut when the ram reaches the end of its stroke but whilst racing the crew always disengage the lock before the end of the ram stroke is reached?
3. Would the **control system** described infringe either or both of rules 21.2 or 21.3 if the lock is disengaged using feedback of the **yacht state** (either **mechanically** or by an **ECC** and/or **HCC**) but only when the rope carries no load and the **control system** is not being used to control a **control surface**?

Secondly, considering the situation where the bullet has been disengaged and is then pulled back into contact with the lock, such that when the bullet hits the lock the rope taut and is adjusting the **control function:**

4. Would the **control system** described infringe the last paragraph of rule 21.3 by providing indexed control of the **control function** if the ram and lock is free to move (without any significant load) when the bullet hits the lock?
5. Would the **control system** described infringe either or both of rules 21.2 or 21.3 if the ram and lock is free to move when the bullet hits the lock and the lock engages automatically when the bullet hits the lock?
6. Would the **control system** described infringe the last paragraph of rule 21.3 by providing indexed control of the **control function** if the ram and lock is not free to move when the bullet hits the lock?
7. Would the **control system** described infringe either or both of rules 21.2 or 21.3 if the lock is engaged using feedback of the **yacht state** (either **mechanically** or by an **ECC** and/or **HCC**) but only when the rope carries no load and the **control system** is not being used to control a **control surface**?

Thirdly, consider a pair of running backstays operated by **control systems** of the type illustrated in figure 1 where the leeward runner **control system** is set up with the bullet engaged and the ram at a fixed position with the running backstay unloaded in preparation for controlling a **control surface** as permitted by rule 12.9b:

8. If, after a tack, without adjusting the **control system** the running backstay becomes loaded, does the **control system** infringe the last paragraph of rule 21.3 by providing indexed control of the **control function**?

If the answer to question 8 is "Yes" would the answer be any different if the running backstays were controlled solely by winches?

Interpretation:

Not applicable

Answers:

1. No. If, as described, the rope is never taut when the ram reaches the end of its stroke, the end-stop on the ram does not provide greater control or an index position for the **control function**.
2. Yes. In this scenario, the end stop of the rope (i.e. the bullet) is being adjusted by the ram creating more indexed points.
3. Yes. Using feedback of the **yacht state** to set the position of a **control system**, which may in the future set the position of a **control function** infringes Rule 21.2. Using a **HCC** or an **ECC** to release the lock would infringe Rule 21.3(b), because it isn´t at the extent of motion. **Control systems** are subject to the feedback provisions defined in Rule 21.2 at all times.
4. No. the described situation does not provide greater control or indexed control. However, if the ram can then be extended to its limit of travel with the lock still engaged and rope taut, answer 2 applies.
5. Yes, it would infringe 21.2 by using feedback of the **yacht state** to lock the bullet. 21.3 b) is infringed because the lock can engage at a point other than the extent of motion.
6. Yes.
7. Yes. See answer 3.
8. No, providing that the position of the newly loaded running backstay has not been set using feedback of the **yacht state** or greater indexed control.

Competitors are advised that for a feature to be ruled compliant it must comply with the Rule through its full range of motion and its complete instances of functionalities. Discriminating particular moments in the range of motion of the described feature does not make it legal throughout.

END