Sir

After sitting on the sea wall at Marina Green in San Francisco watching the AC cats barrel down at us, it is apparent that we are in a brave new world. Though I agree that the current machines, while magnificent, may be a bit too pricey for a larger-scale regatta, I must take some issue with your advocacy of a return to 'soft' sails.

The problem of dismounting the rig every night can be solved in the same way we did it for the original America's Cup cat in 1988. The entire 60ft boat was craned out of the water, locked down in a hydraulically operated cradle and the whole package was laid on its side with a prop under the end of the 80ft+ wing sail. The storage spot was behind a double stack of shipping containers that served as the workshops and warehouses for the syndicate.

This operation required about six people for the 60ft cat… and was quickly reversed in the morning for sailing.

These cradles could be fabricated in bulk and easily customised for each hull shape by the syndicates with some simple grp work. It would have to be cheaper than constantly dismantling the boats since the fabrication work would be a one-time expense, not a continuing salary issue.

I've seen Unlimited Hydroplanes and Tornado cats transported by road in much the same manner…

Keep up the excellent work with your great mag!

Mark Weinheimer,
sailmaker for Stars and Stripes 1985-87 and, with Randy Smyth, for the 1988 cat

DPPI

Racing would go ahead on schedule every day and we would no longer have the embarrassment of America's Cup yachts scurrying for shelter while kids merrily raced their Optimists.

Yet the reality proved otherwise. Following the death of Andrew Simpson in the May capsize of the Artemis Racing boat, racing wind limits were reduced to 23kt with a tidal factor added or subtracted depending on the flood or ebb.

With a format of first to win nine races, there was always the potential for this Cup to be the longest ever. But a combination of weather plus Oracle Team USA starting with a -2 on their dance card conspired to drag it out even further.

Because of its cheating penalty Oracle Team USA would effectively have to win 11 races, which seemed a big ask. But, in practice, Emirates Team New Zealand were even more severely punished by the weather. Stranded on match point, the challengers suffered three races blown off while they were in the lead, two because wind limits were exceeded and one because, in an atypical light-wind day, the time limit was exceeded. To win this thing they were arguably going to need 12 races.

The 40-minute time limit was farcical. Regatta director Iain Murray admitted that VPPs for the boats indicated that sending them away in anything less than 10kt would be futile: they wouldn't make it around in time. So much for a 5kt lower limit.

The schedule of two races a day, with just 30 minutes in between and no start later than 2.40pm, was also put in place to ensure television attention spans would be met. But again the restriction was too tight and on five occasions the second race could not be sailed because of the wind conditions.

Two complete days of racing were lost because of too much wind, or the wind in the wrong direction.

Seen in the context of such tight operating constraints, San Francisco's much vaunted reliable weather proved to be as fickle as just about any other city's. And Mother Nature gave a firm reminder that technology and TV schedules will never trump her own ability to confound the best-laid plans.

Ivor Wilkins

SOMETHING EXTRAORDINARY – Giovanni Ceccarelli and the *Costa Concordia*

The whole world saw the timelapse video of the *Costa Concordia*'s righting operation on television: it was a mammoth task on a scale never attempted before, the consequence of some great teamwork. This also included well-known Italian raceboat designer Giovanni Ceccarelli (who designed ACC yachts for Mascalzone Latino and +39 Challenge), who proposed the original rotation and refloating solution to contractors Titan Micoperi.

But why was a well-established yacht designer onboard the *Micoperi 30* crane platform, helping to direct the recovery operation of the giant *Costa Concordia*? 'I understand the surprise of those who know Ceccarelli Yacht Design for all of the sailing and motor yachts we have designed since the 1950s, when the firm was founded by my father Epaminonda,' says Giovanni.

'However, in our many years of work CYD have also designed a number of marinas and offshore platforms. But the real reason why I'm currently here is more emotional: when the accident occurred I thought – and I was not alone in this – that the whole Italian seafaring culture had taken a very hard knock in terms of how we are regarded on the global stage. Therefore, I had the idea that it was Italy who should now find the solution for the removal of the wreck.

'This is the largest operation of its kind ever attempted, so there was no specific know-how already in place. At the time we started work I also didn't even have much knowledge about salvage companies in general.'

Ceccarelli's role is engineering manager. 'I am the person who co-ordinates all the various engineering activities,' he explains, 'and who shares the strategic choices with the client – the ship owner Costa Crociere – and with the senior salvage master, Mike Sloane, the man who is ultimately responsible for righting and refloating the vessel.

'Sloane is also himself a racing yachtsman. He is a South African and was involved in the initial stages of the Shosholoza challenge in addition to taking part in a leg of the Volvo Ocean Race. These shared roots give the two of us more affinity when we are working side by side.

'Going back to my own role, I had the original idea for the project's solution that has since been employed, but it was then of course engineered by pretty much everyone involved. This is not just a project for marine engineers, environmental or civil, but it is an undertaking to which all these figures contribute, with the addition of numerous other professions, including several top-level structural engineers.'

So has the experience of yacht design and sailing been of help in some creative problem solving? 'The approach to this giant problem has demanded successful innovation on every single day and at every single level,' says Ceccarelli, 'because there ▷

Salvage engineering on a giant scale. Empty, the displacement of the *Costa Concordia* exceeded 114,000 tons before factoring in the vast weight of water trapped in the wreck. The original tear in the hull bottom was more than 50m making a patch-up impossible. Now that she is upright once again work is underway to refloat the vessel – with the final removal to a scrapyard scheduled for spring 2014

are no similar cases to rely upon as a reference: because of the size of the ship, because the wreck is only partially sunk and because, above all, of the proximity of a beautiful unspoilt coastline that we must take every precaution against damaging.

'In a situation of this kind the multidisciplinary approach, with experiences from very different backgrounds, can lead to the design of very innovative solutions. Some of the technical solutions to specific problems have been borrowed from yachting, such as the retention/securing system for the ship as it is righted: the cables are partly in steel chain and partly in Dyneema because it is so much easier for the divers (of whom there are over 100) to handle.

'But what I would like to point out, on a personal level, is how much confidence I had in terms of the project co-ordination, on the back of the great teamwork experience I gained during two America's Cup challenges where I was the principal designer. In Auckland and Valencia I also had to co-ordinate a multinational group of skilled technicians, and exactly the same situation arose here.'

Ceccarelli explains the step-by-step approach to the delicate operation of getting the *Costa Concordia* back upright: 'Due to the length of the tear in the hull we knew that the wreck was not repairable. Consequently we decided to consider the *Costa Concordia* as simply a partly waterlogged "lump" of steel that we needed somehow to refloat… albeit a rather large lump. So we started with the idea of this piece of water-filled steel that needed to be refloated.

'The wreck was lying on the bottom at a "heel angle" of about 65°, perched primarily on two rock promontories with much deeper water just offshore. The first phase involved the anchoring and stabilisation of the wreck to prevent it slipping or sinking deeper down the steep seabed. This was also essential if the team were to work safely – even in bad weather.

'The stabilisation was achieved using an anchoring system made up of four submarine anchor blocks fixed to the sea bottom in the space between the centre of the wreck and the coast. The second stage, divided into two separate phases, involved the preparation of the false bottom on which the wreck would rest after the rotation.

'Firstly, giant grout bags were carefully positioned and filled with cement to occupy the empty space between the two rock spurs on which the vessel was quite perilously perched (one in the stern area and the other in the bow of the hull). Once these were set they and the rock itself would provide a stable base for the hull.

'After the divers had positioned the bags a special eco-friendly concrete was prepared on a barge and then injected into them (these grout bags had substantial attachment points built in to ▷

A lot of different boats suffered a lot of damage during November's big blow in Brittany. This is the Multi 50 trimaran *Maitre Jacques* which destroyed the front of its starboard float just a few hours after the much delayed start of the 2013 Transat Jacques Vabre

JESUS RENEDO

facilitate the subsequent clean-up operation). After the grout bags had set, three large steel platforms and three smaller ones were delivered and fixed carefully in place.

'The piles were then inserted into the granite seabed after holes of 2m diameter had been carefully drilled for them, using a closed loop system so that no waste was dispersed into the sea. After preparing and putting in place the false bottom onto which the ship would ultimately be rolled upright, the *Micoperi 30* crane was then used to install 15 "refloating" sponsons that were welded directly onto the port side of the wreck.

'The righting itself was performed using large (sic) jacks which tensioned several cables in unison, each being attached to the top of the sponsons and down to the platform; meanwhile, a similar set of cables attached to the starboard turrets were kept tensioned to avoid the whole vessel rolling over the other way. The empty sponsons on the portside also served to slow down and dampen the rotation of the wreck onto the false bottom because of their positive buoyancy.

'This whole process looked rather simple – crude even – but it was in fact extremely delicate. As well as avoiding the risk of the ship overbalancing, we also had to keep all the loads very carefully balanced to avoid deforming the damaged hull and even rupturing the vessel further.

'Once the vessel was upright and sitting on the false bottom then a matching set of 15 refloating sponsons was attached to the starboard side of the wreck. All of these caissons will eventually be pumped out during the final refloating stage.

'At the moment the hull is resting satisfactorily on the false bottom in an average water depth of about 30m. A pneumatic system will then be used to empty the water gradually from the sponsons evenly on both sides of the wreck, giving sufficient buoyancy for the whole structure to float, ship plus caissons plus false bottom.

'On completion of this emptying process, the whole structure will draw about 18m… It will then be ready to be towed to a shipyard where the vessel will be scrapped.'

Oh yes, while refloating the *Costa Concordia*, this talented Italian engineer and yacht designer also found time to launch his latest Neo400 ORC racer, with a larger 52ft Neo500 now on his drawing board in Ravenna as well…

Not bad for a summer's work.

Giuliano Luzzatto ❑

SNAPSHOTS

- **Staying put…** Australian Tom Slingsby will not be leaving Oracle Racing any time soon
- **Shows…** that the successful US defenders of the Cup are not sitting idly on their hands while rivals nibble away at their human resources
- **Legends all…** as we closed for press the Australian Etchells championship was being won by Australia II alumnae John Bertrand and Grant Simmer plus America's Cup coach Andrew Palfrey
- **Success…** Saildrone 1 (issue 406) arrived safely in Hawaii after 34 days at sea
- **Poor thing…** Saildrone was promptly retasked and set off again, this time for the South Pacific
- **Lift-off…** the elegant Great Cup 32 cats will get their long awaited lift foils in time for 2014
- **So nearly…** runner-up finishes were recorded by the latest Hollom-designed International 14 and National 12 at their respective 2013 championships
- **Yes no…** Thomas Coville's latest solo round-the-world record attempt lasted less than a day before he was forced back by a halyard failure
- **Bravo, Alex…** Alexandre Caizergues has recaptured the kiteboarding world record with a run of 56.62kt
- **Nowhere near…** Paul Larsen's outright record of 65.45kt, however…
- **Meanwhile…** Larsen's name has been linked with his countryman Bob Oatley's America's Cup plans
- **Odd…** 1988 Olympic 470 bronze medal sailor Larisa Moskalenko has been arrested in connection with the supply of boats to alleged people traffickers
- **Inch by inch…** over 100 boats took advantage of the new, simplified 'Limited Validity' IRC certification this summer
- **Bang bang…** two interesting new '30-footers' are getting going: the Farr 280 and a new C&C 30 from Barry Carroll, Mark Mills and US Watercraft
- **Hold the front page…** Nathan Outteridge didn't win
- **Instead…** he finished as runner-up to Bora Gulari at the 2013 Moth Worlds in Hawaii
- **How do you…** seize a harbour?
- **That's the task…** set by a judge in Sicily, who has authorised the seizure of 'part of' Trapani Harbour following an investigation into contract fixing prior to the 2005 Louis Vuitton Act at that venue
- **Interesting aside…** Future Fibres and Persico have jointly produced a carbon chassis for a new lightweight road car: the RP-one
- **Now please…** check out ScuttlebuttEurope and RaceboatsOnly at seahorsemagazine.com