Evaluating Modern Catamarans

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www.SVSoggypaws.com/Presentations

Update 12/7/15


SV Soggy Paws Florida to the Philippines
ASIA
NORTH AMERICA
SOUTH AMERICA
AUSTRALIA
PACIFIC OCEAN
2007
Hawai'i
2011
Philippines
F.S.M.
Marshall Islands
2013
Palau
2014
Tarawa
Samoas
Fiji
Tonga
2012
French Polynesia
2008–09
Galapagos
2010
Pitcairn Islands
Easter Island
~30,000 nm
N

Introduction

- **20 years ago - 1996**
  - 1981 CSY 44 WT my first BW cruiser
  - needed work, but retired w/ time
- **3 years ago - 2013**
  - 40 K nm**,** sailed around Carib and across Pacific
  - I wanted less maintenance & motion & more room
  - Sherry wanted comfortable computer/office space & more speed
  - we started looking at cats as possible future boat

Introduction

- **Problems** –
  - find suitable boat at reasonable price in 3rd world
  - get both boats together to transfer our stuff
  - sell CSY at reasonable price
- **6 months ago – Jun 2015**
  - SF 44 came on market in W Malaysia
  - went to see it, then bought it
  - 2000 nm shakedown trip to PI through terrorist box

Outline

- Blue Water Cruising Boat Features
- Monohulls vs Catamarans
- Catamaran History
- Some Things We Learned
- Explaining Important Cat Characteristics
- Evaluating Common Cat Features
- References & Cautions
- End

Our Desirable Blue Water Cruising Boat Features

- Suitable for long distance voyaging
- Comfortable for extended living aboard
- Substantial load carrying capacity
- Safe at sea or at anchor in a storm
- Substantial fuel & water capacity
- Strong quality build
- Reasonable draft < 6’
- Reasonable Mom/Pop size - 40-47’
- Affordable cost

Monohulls vs Catamarans

Monohulls vs Catamarans

- 2000 nm Shakedown Observations
- Internet List of Advantages and Drawbacks
- Safety
- Speed
- Volume & Windage
- Price
- Comfort
- Draft
- Appearance

Cat During 2000 nm Shakedown

- 38 years w/ monohull, 2 years with multihull
- Safer at sea – crash blkheads, boat won't sink
- Motoring – better speed & fuel economy
- Easier downwind sailing – no pole or rolling
- Sailing – better speed & little heel
  - normal meals on table, things stay put on counters, minimal stow for sea
- Autopilot - much better function, less amps
- Dinghy storage - convenient on davits
- Wide decks - safer reefing and sail handling
- Able to read and use computer underway

Multihull Advantages	Multihull Drawbacks
Unsinkable – foam construction and more watertight bulkheads	Usually more expensive, length for length
Non-heeling environment	Will stay inverted when flipped
Higher average speeds	Bridgdecks can slam if not high enough
More interior space, 360 degree views, optimized layout	Not as easy to find dock space-Location dependent
Shallow draft – safer and more access to harbors, more anchorage possibilities	Usually performance decreases more rapidly than a monohull when overloaded
Twin engine and twin rudder redundancy	Windage can be high
Safer sail-handling and reefing procedure	Quicker motion, especially sailing upwind
Better interior steering station – often forward facing	Not fleet-friendly racers
Better protection in cockpit against sun and rain	More maintenance -Age dependent

Better autopilot function

Ability to beach and access for repairs

Better maneuverability in harbor

More deck space and user friendly trampoline

Better ventilation possibilities via emergency hatches, even in rain

More confidence-inspiring for beginners / less seasickness

Longer range and more efficient under power

Galley-up location

Separation and privacy of twin hulls

Lower environmental impact – more efficient

Dries out upright

Easier access from water via transom steps

Better dinghy storage on davits between hulls

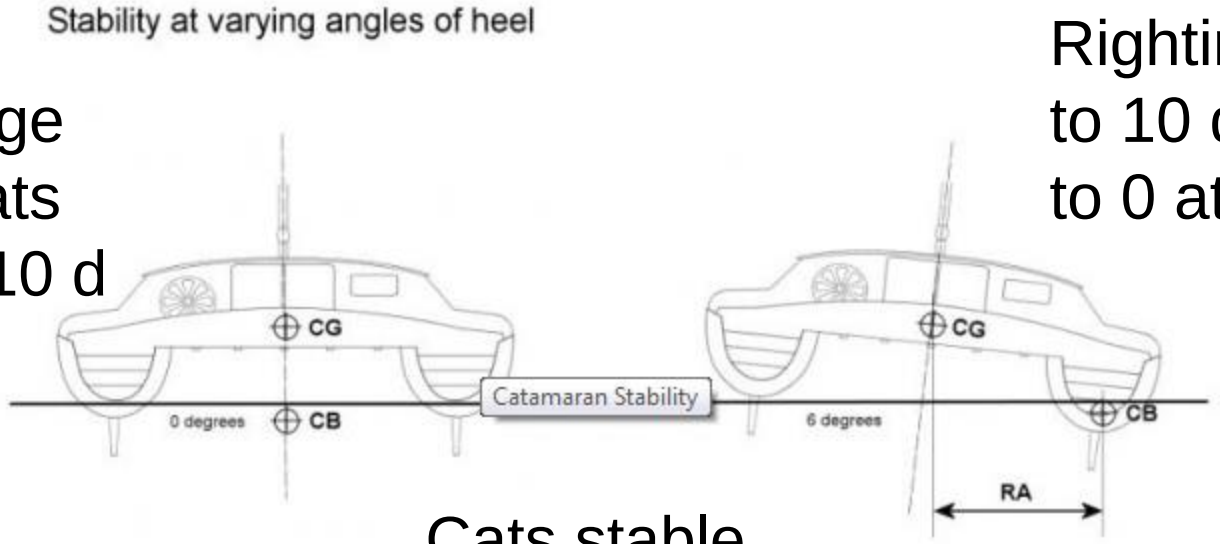

Wide decks,
sailing flat, off
wind w/ no pole!

Safety

- **Cats capsize** about as often as **monohulls sink** but for different reasons:
  - **Monos**- rolled by big waves, hit something, grounding
  - **Cats-** overpowered racing or by inattentive crew, **flying in winds > 100 kts**
- **Both types reasonably safe** if good design and handled by prudent experienced crew
- **Many modern cats won't sink** regardless of damage due to thick foam cored hull, waterproof crash compartments, no lead keel
- Cats **better stability at anchor or on sea anchor** due to wide bridle attachment
- Cat owner mantra - **Is it better to be upside down on the surface or right side up on the bottom?**

Stability and Righting Arm

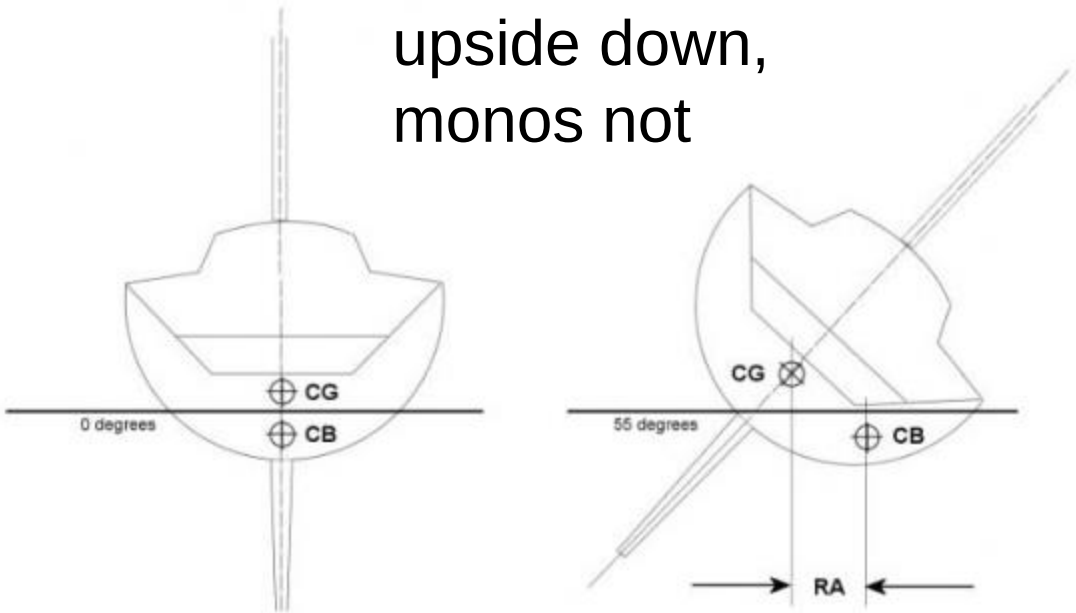
Wind gets under bridge deck as cats heel past 10 d



Righting arm huge to 10 d, then drops to 0 at 90 d

Cats stable upside down, monos not

Heeling causes monos to spill wind

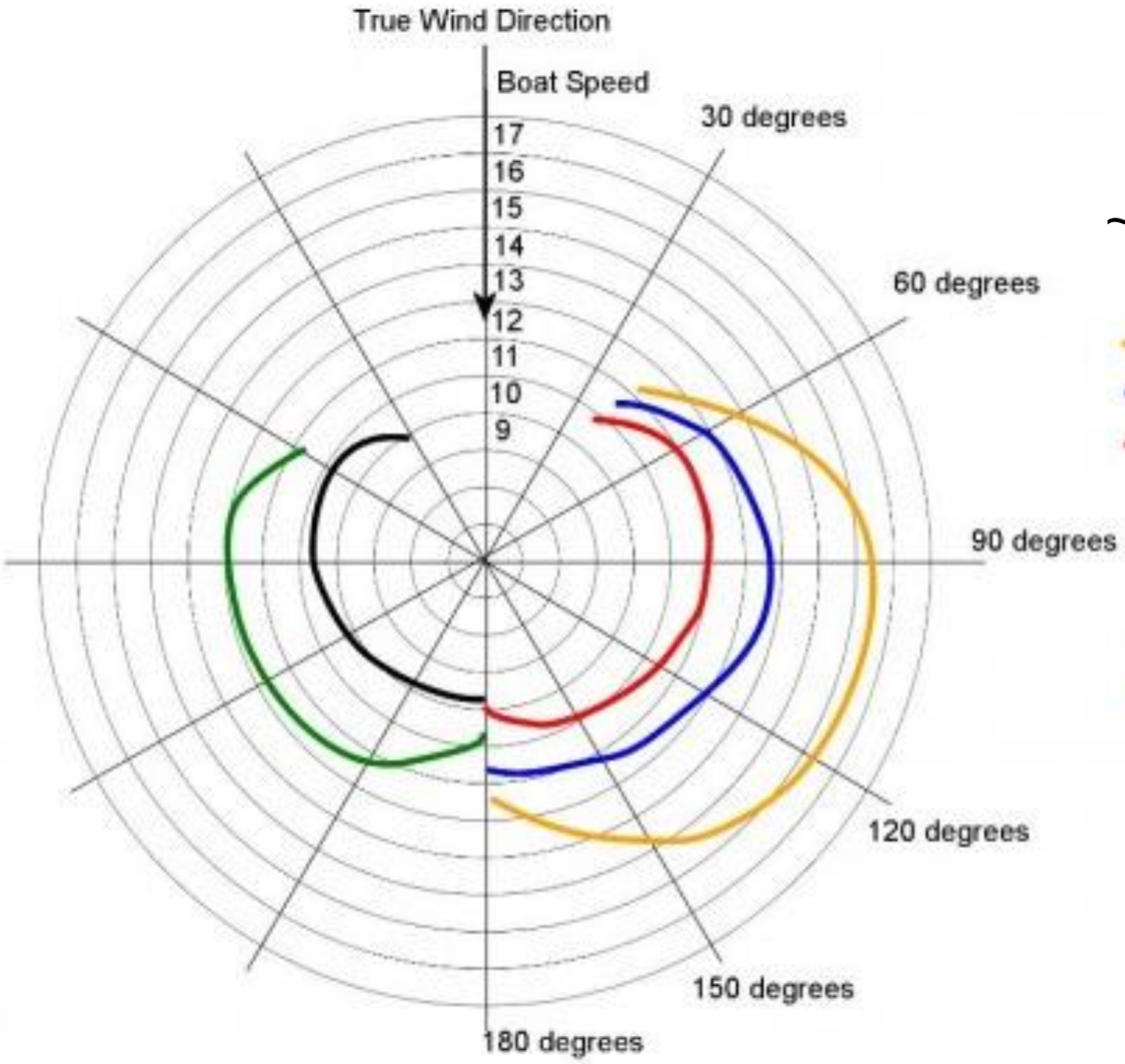


Righting arm gradually get larger to 70 d, 0 at 140 d

Speed

- On average modern cats give **20% faster long passage speeds**
- Up wind speeds and tacking angle comparable to good **cruising monohull**
- **Up to 40% faster on beam reach & down wind** due in part to better, smaller apparent wind angles
- SF 44-
  - Sailing: **6-9 kts w/ 12-18 kts of wind**
  - Motoring:
  - **~5.5 kts @ 2K RPM one engine @1.5 lph**
  - ~7+ kts @ 2K RPM two engines @ 3.0 lph
  - ~8 kts @ 2.8K RPM two engines @ 5 lph

Potential Speed Comparison:
~15 kts red & black
~20 kts yellow & green



45' CATAMARAN

- 20 knots with gennaker
- 20 knots True Wind
- 14-16 knots True Wind

45' MONOHULL

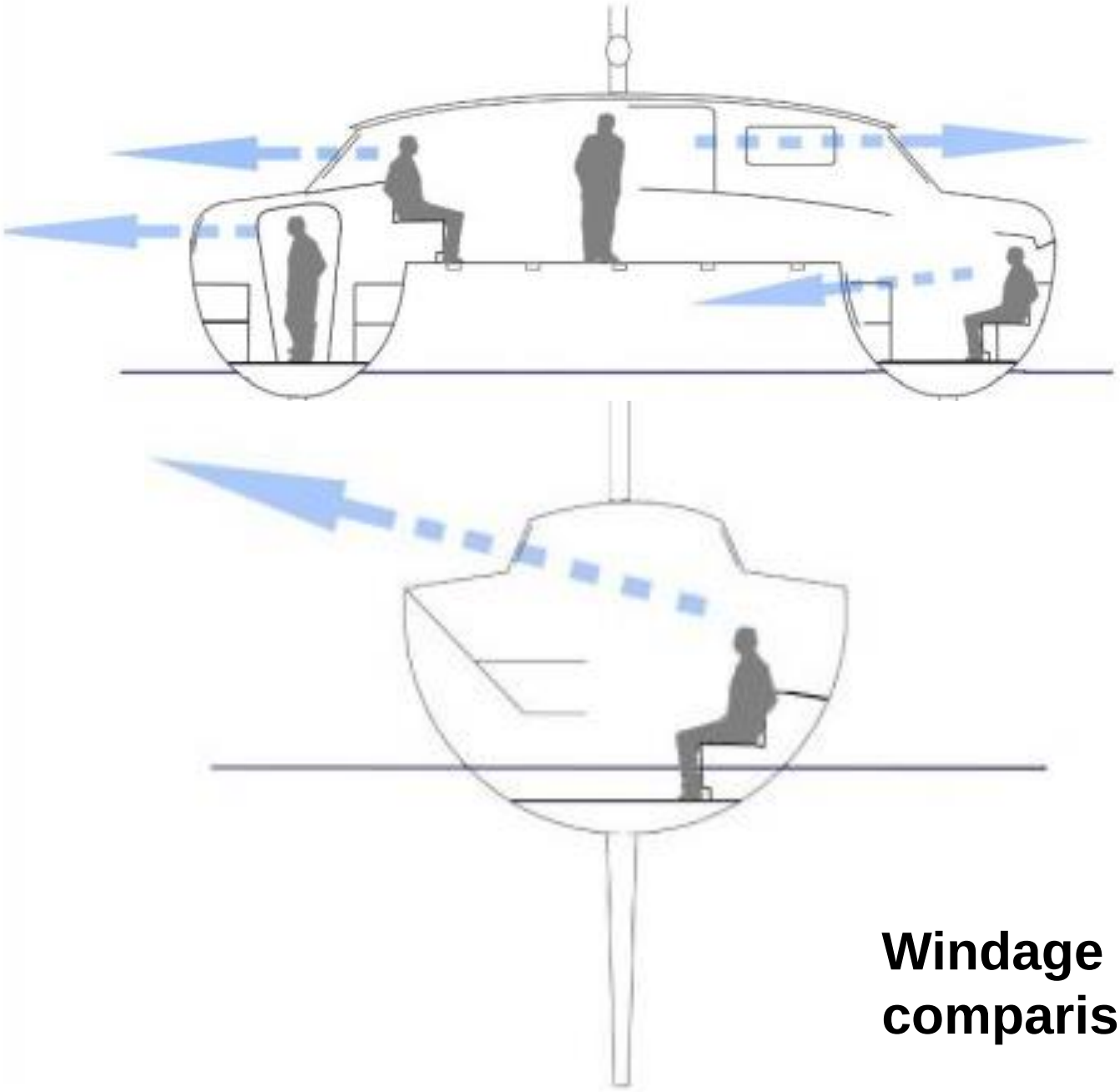
- 14-16 knots True Wind
- 20 knots with spinnaker

Catamaran speed is relative. Personally, I find, the most important benefit of speed of a multihull is the ability to outrun bad weather. Being able to average 11 knots on a catamaran rather than 8 knots on a

Typical cat downwind

Volume and Windage

- Cats have **much more active living space** & accessible storage space
- Modern cat has:
  - **40 % more volume** as similar length mono
  - similar volume as **10’ larger mono**
- Cats have **less loading capacity** than mono
- **Cautions:**
  - higher topsides and cabin means more windage
  - overloading has serious effect on performance
  - Cats can fly in tropical cyclones (>~100 kts)



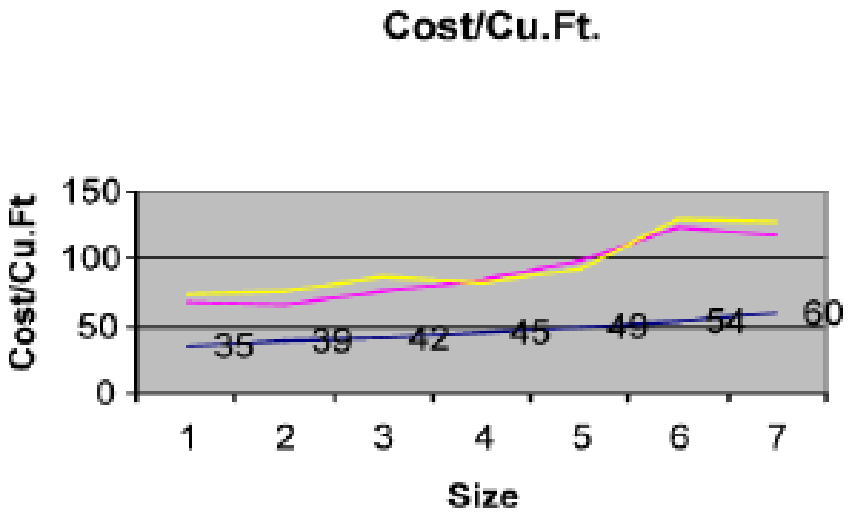
Windage & view comparison

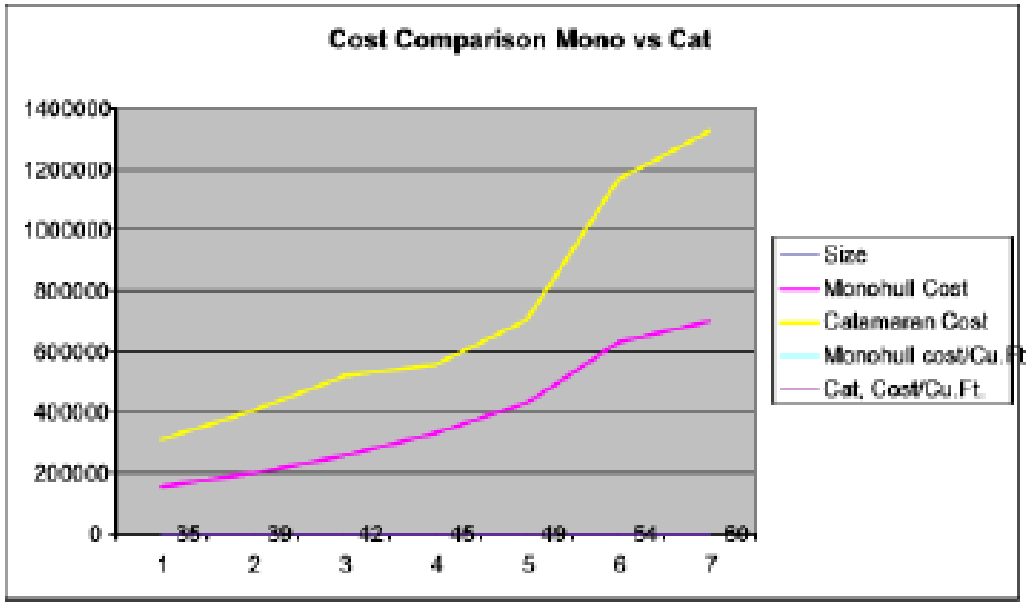
Price

- New cat price per pound higher, **price per cu foot same** as mono
- **Used boat** prices variable, depend on age, condition, competition and local market
- Lots of **charter cats available overseas** at good prices – some work required!
- Buyers must learn to **negotiate effectively**
- Price examples –
  - 38’ 1998 FP or 1996 SF 44 cats - $120K
  - 42’ 2002? Custom cat - $150K
  - 46’ 2002? FP Bahia - $290K

New Catamaran vs Monohull Prices

Start with it's not such an easy comparison. But let's take a shot. The graphs support the idea that catamarans cost more per foot, but about the same as monohulls when you look at "cost/cu. ft." This seems to be born out in our experience--I can tell you that you definitely get more volume in a given size catamaran.



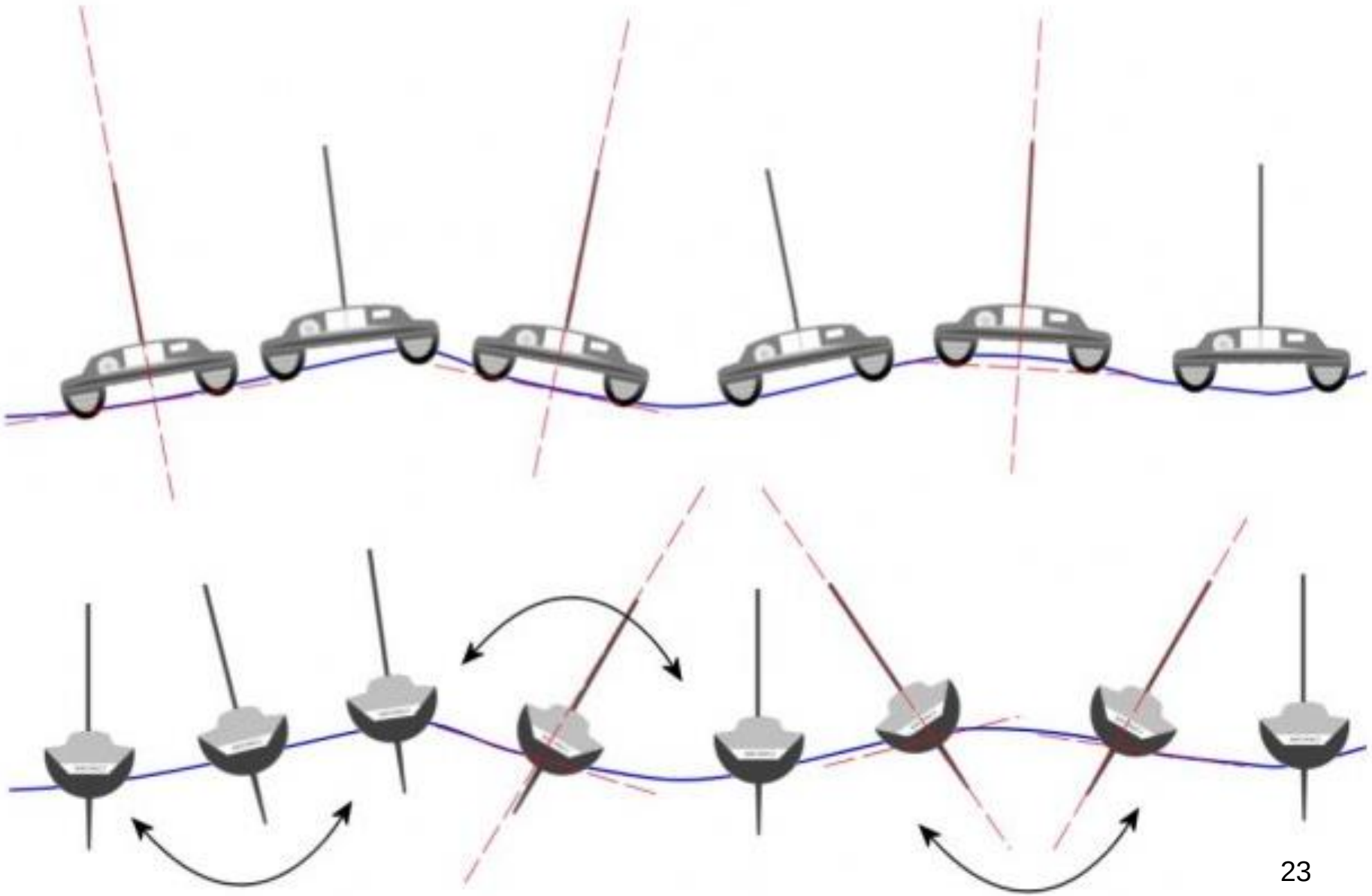


Some people say you can buy a smaller catamaran to get the same space as a monohull you are looking at and in that case the costs get comparable. In addition, don't forget, in a Cat the loads are higher, due to the enormous stability (creating a need for next size larger hardware) and much of the equipment, such as engines, are replicated so you simply have more expense. Look at the graphs to get some idea of what I'm talking about.

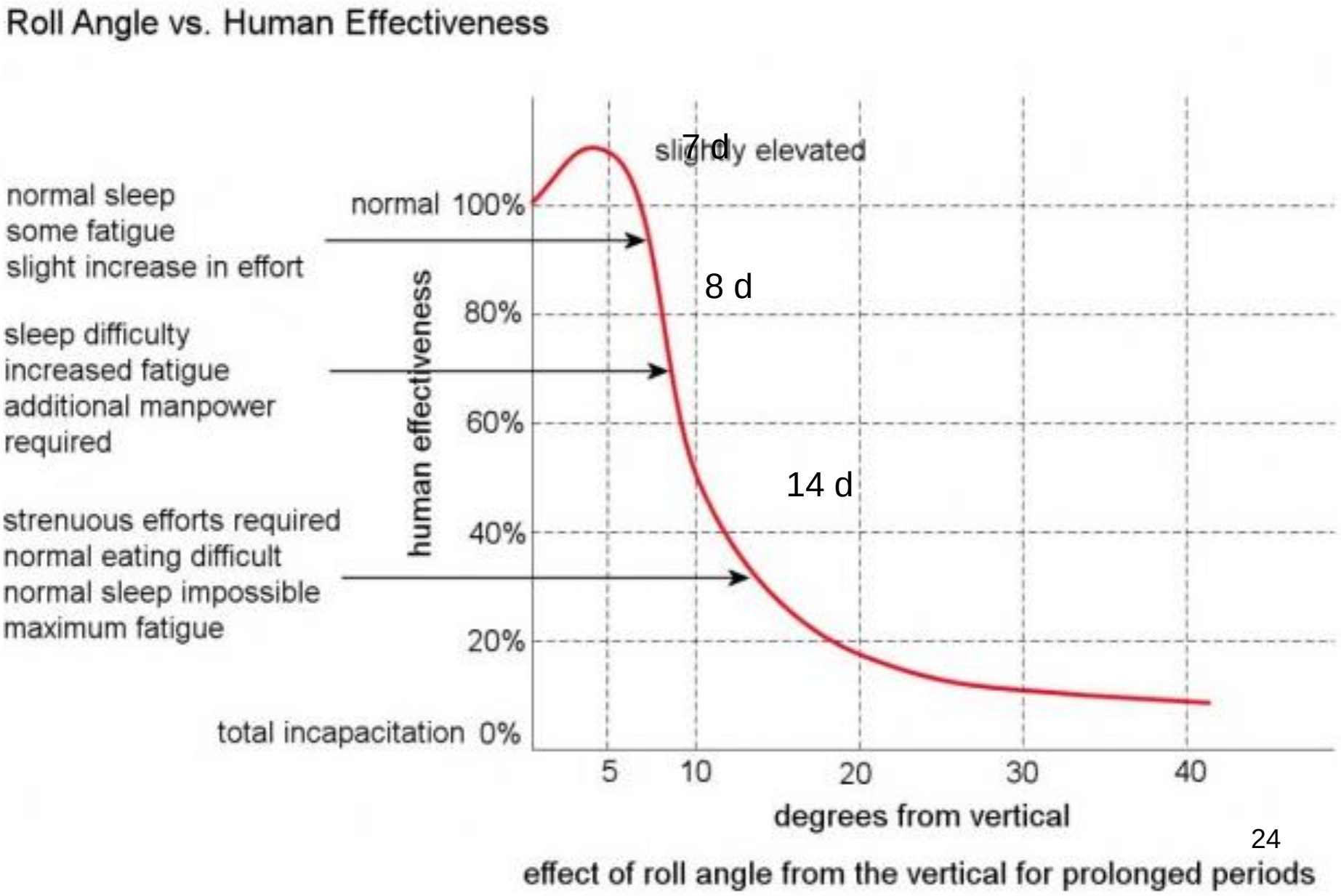
Comfort

- **Cats:**
  - **roll & yaw far less in port**
  - **much more room** to move about and stand watch
  - saloon and cockpit on same level
  - visibility in all directions from cockpit & saloon
  - ride over seas in jerky motion, **but little roll**
  - **never should heel more than ~5 degrees**
- **Monos**:
  - **smoother ride** through choppy seas, but **can roll**
  - more **even speeds** in varying wind

Roll Behavior & Pendulum Effect



US Navy Fatigue Study



effect of roll angle from the vertical for prolonged periods

Draft


-beaching for maintenance
-hurricane safety
-less grounding danger
-anchoring advantage

Appearance

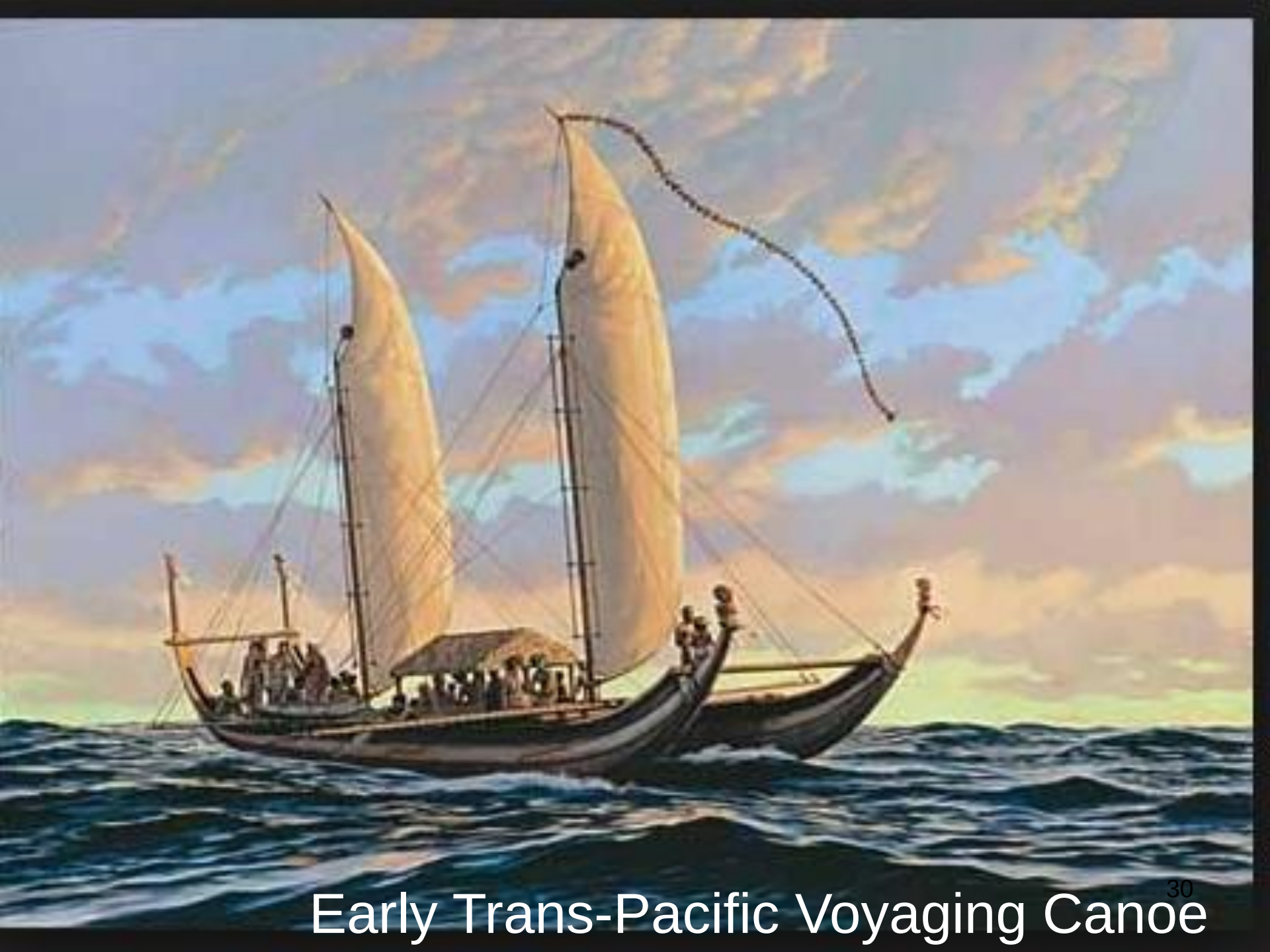
Up to the eye of the beholder!!


SCOOBY PAWS

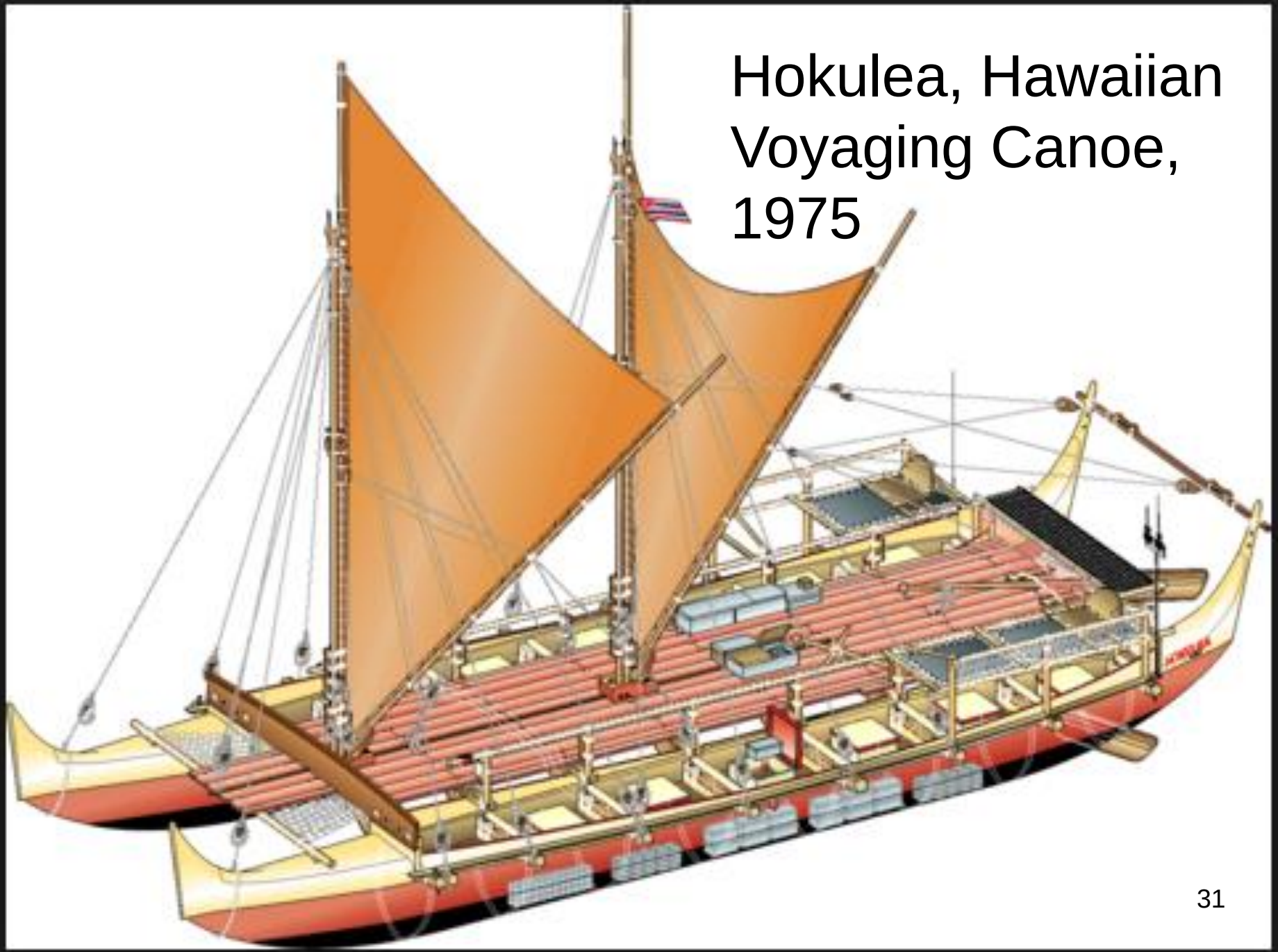
Catamaran Development And Design Evolution

Catamaran Development

- “Thousands of Pacific Islanders have sailed thousands of multihulls in the Pacific for thousands of years”
- 1500 years ago early **Polynesian** transpacific voyages
- First modern cats by **Rudy Chow** in late 1940s
- CSK cats started in Hawaii in mid 1950s
- Early 1960s - **Arthur Piver**, father of modern (home built) trimarans
- 1975 **Hokulea** – famous Hawaiian voyaging canoe replica using traditional navigation



Early Trans-Pacific Voyaging Canoe



Hokulea, Hawaiian Voyaging Canoe, 1975

Rudy Chow and CSK Cats

- 1947 Manu Kai first catamaran modern era
- 1954 Waikiki Surf first ocean racing cat
- 1957 Aikane first CSK design
- 1962 **Lanikai first true cruising cat**
- 1965 **World Cat first cruising cat to circumnavigate**

Manu Kai at Waikiki Beach, 1949.

World Cat racing in New Zealand.

Arthur Piver Trimarans

- 24’ Nugget
- 30’ Nimble
- 1962 35’ **Lodestar first trans Pacific tri**
- Others included Brown, Cross, Horstman, etc

Nice Waters

TRIMARANS 1962

A.Y.R.S. PUBLICATION No. 43

TA'AROA (Dean Kennedy)

CONTENTS

PRICE $1.00 PRICE 5/-

1963

Printed by F. J. Parsons (East Anglian) Ltd., Felixstowe


35’ Lodestar

Quick Overview of Cruising Catamarans (38-45’ range)

Some Modern Production Cats

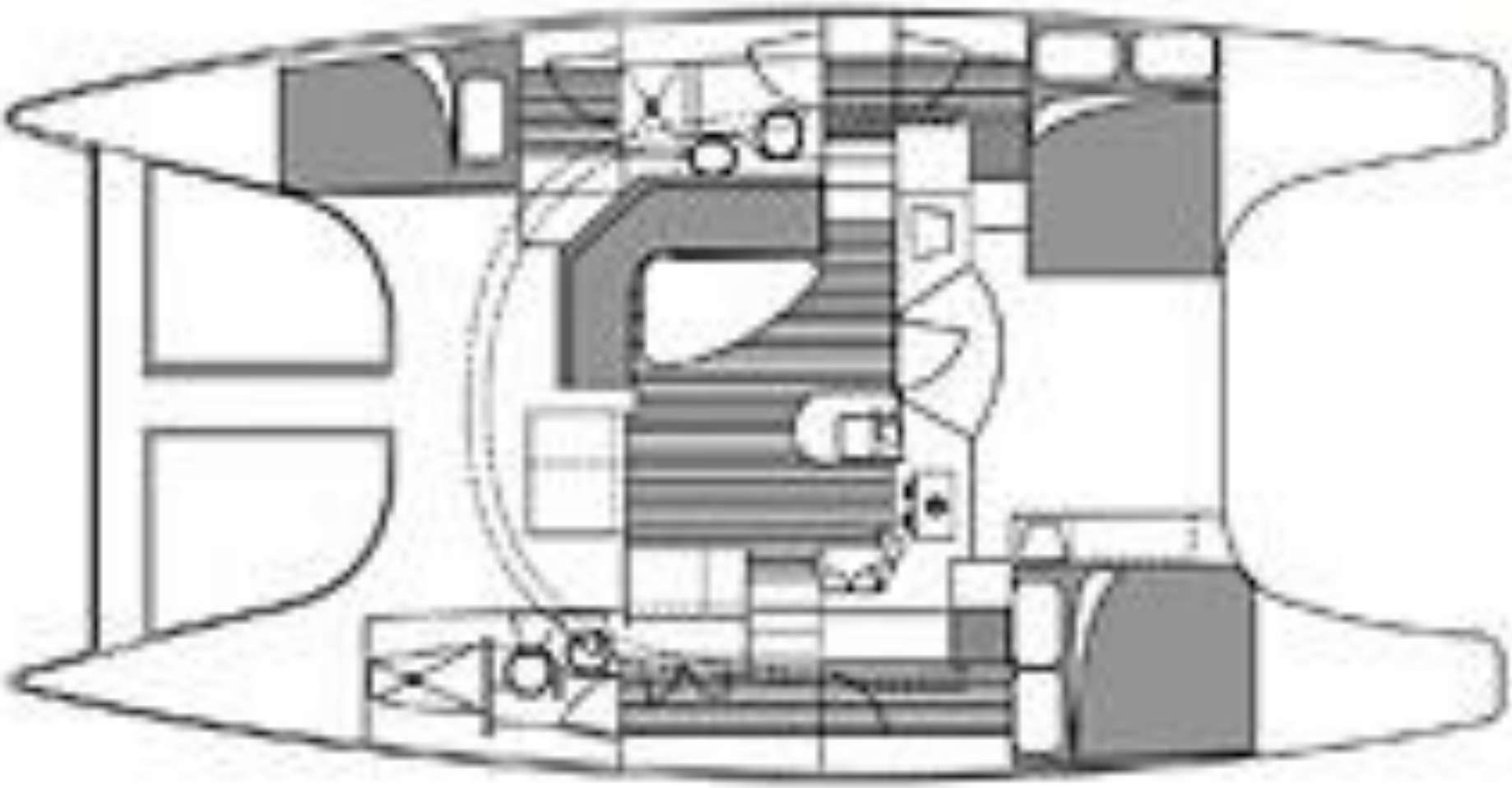
- First Generation: ~1970s - present
  - Prout, Gemni, Catalac, CatFisher - English
- Second Generation: ~1990s- present
  - Catana – France
  - Fontaine Pajot - France
  - Lagoon – France
  - Atlantic – S Africa
  - Leopard – S Africa
  - St Francis – S Africa
  - Manta – US
  - PDQ/Antares – Argentina
  - Many, many others


Prout 39


Fender Locker
Anchor Locker
LP, Spare Anchor Locker
Holding Tank
Forward Head
Navigation Station
Ice Chest
Master Bedroom
Port Crash Compartment
Forward Cabin
Kitchen w/3 Burner Stove, 2 bay sink
Offshore-Only Toilet
Rear Bedroom
Starboard Crash Compartment
Playpen
Saloon
Link Box
Engine
Heater

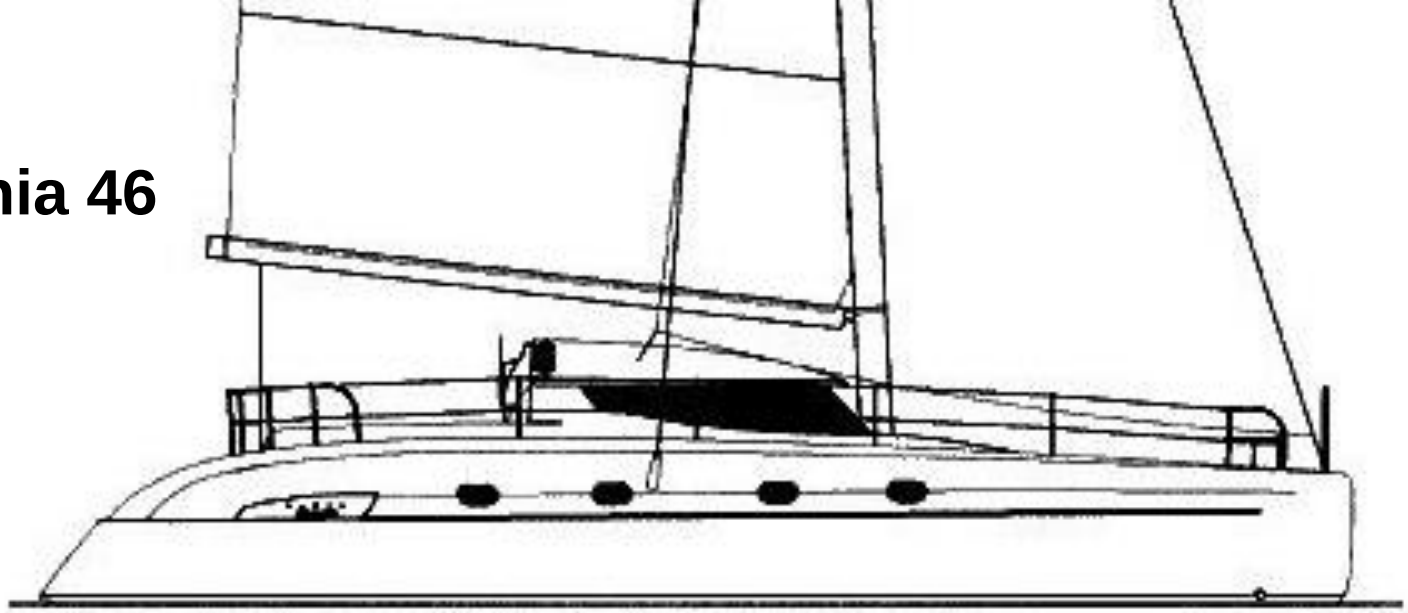
Manta 42

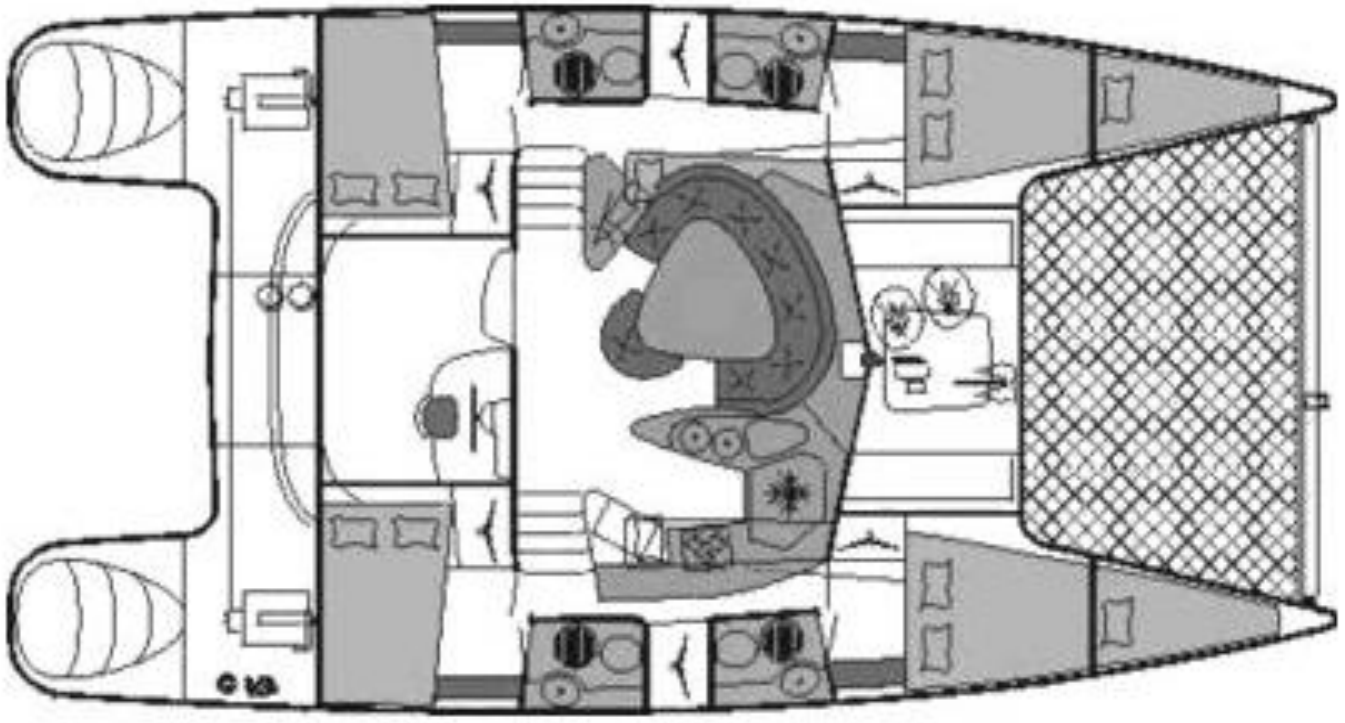
Manta 42



BAHIA 46

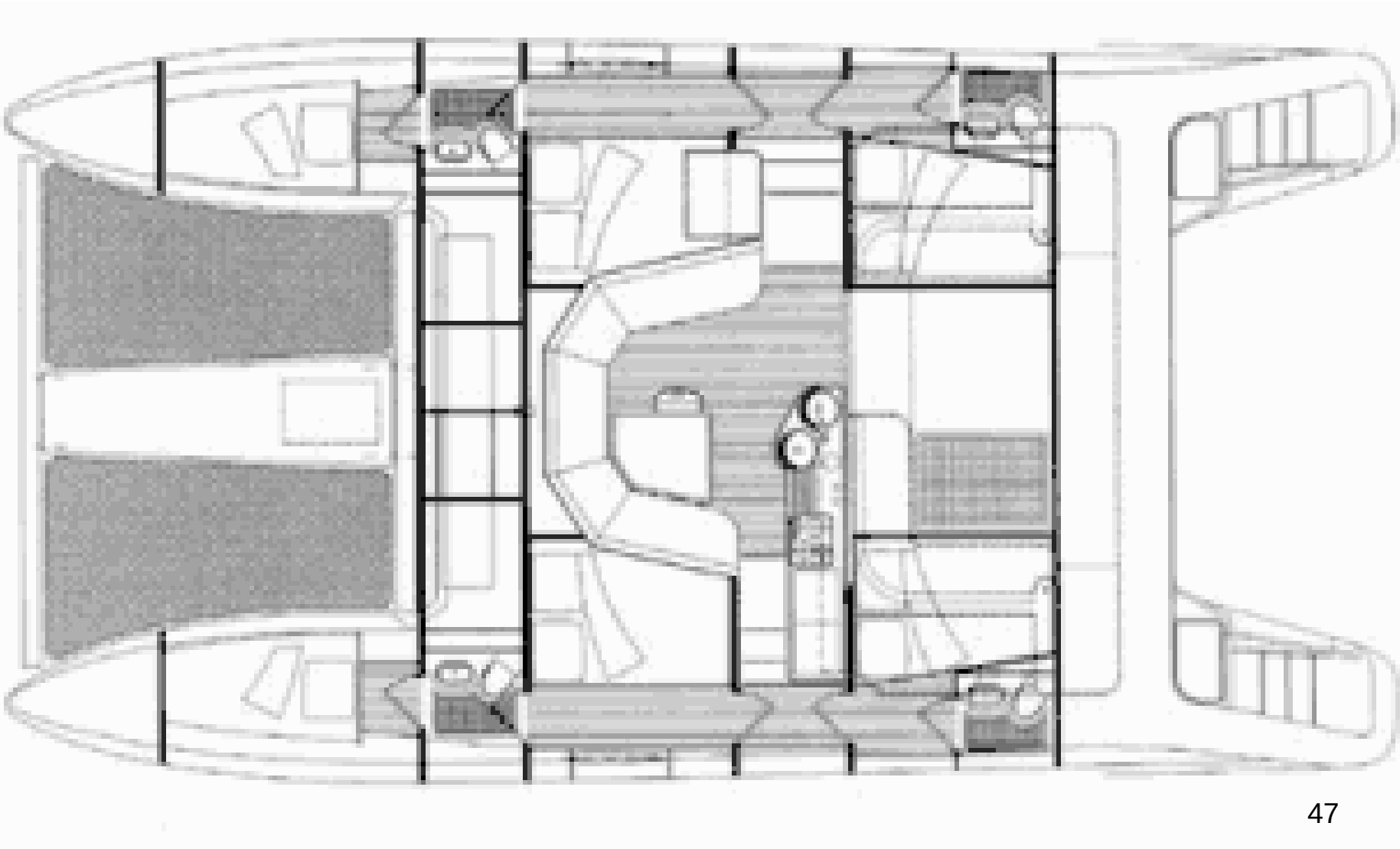
FP Bahia 46



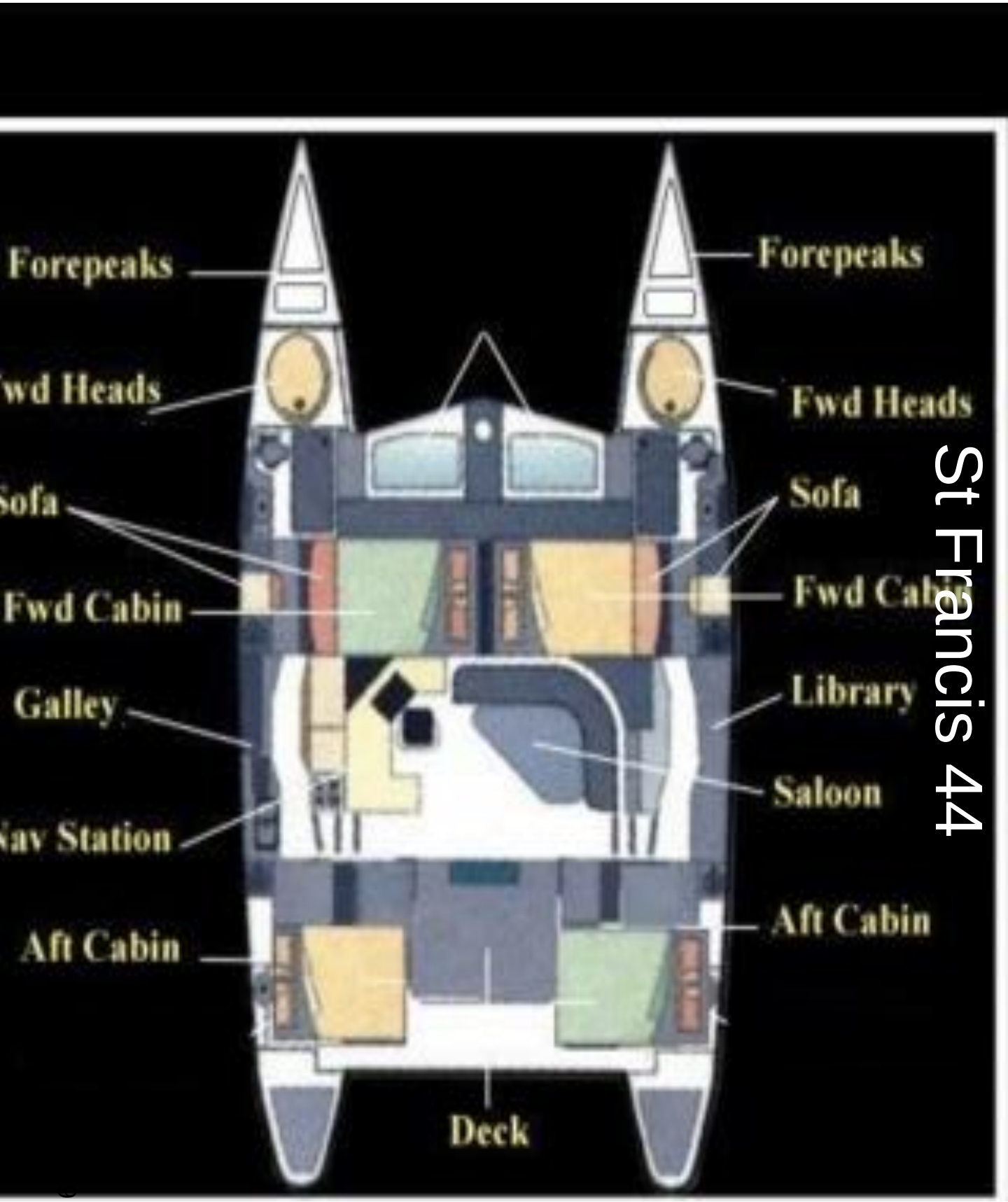



Catana 44

Catana 44



St Francis 44 Mk II


Forepeaks
Forepeaks
wd Heads
Fwd Heads
Sofa
Sofa
Fwd Cabin
Fwd Cabin
Galley
Library
Saloon
Nav Station
Aft Cabin
Aft Cabin
Deck
St Francis 44


Lagoon
44

Lagoon 44 Owner's Version

LAGOON 440 version propriétaire

Leopard 43

Leopard 43

Catamaran Characteristics

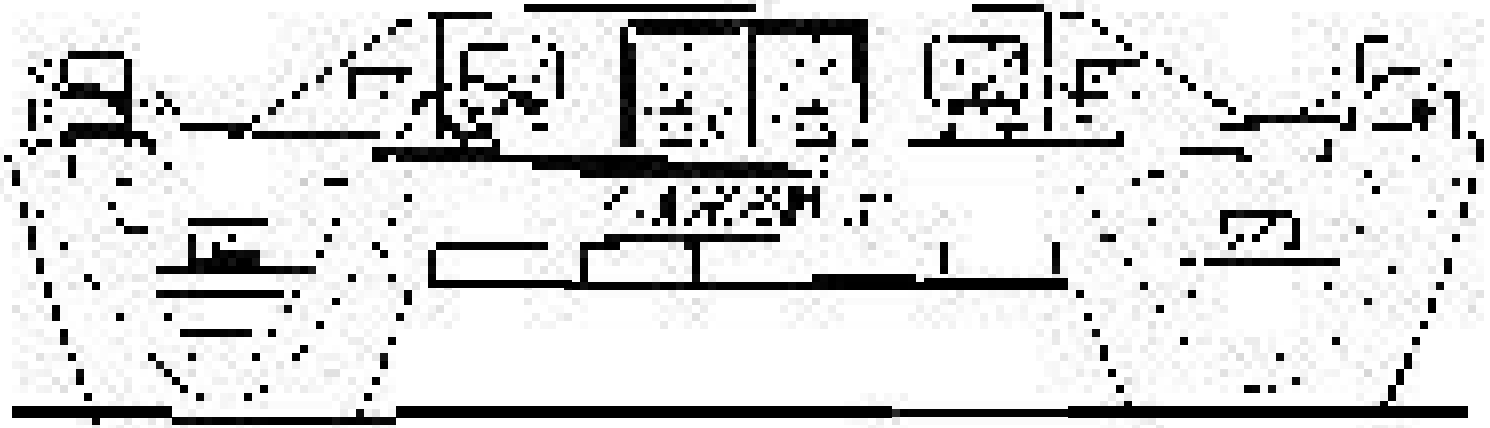
Catamaran Characteristics

- Most important catamaran characteristics:
  - Bridge deck clearance (BDC)
  - Beam/Length ratio (B/L) & static stability
  - Load carrying capacity (LCC)
  - Comfort at sea, including pitching
  - Integrity and quality of build
- From ‘Good Cat Bad Cat’ Article -(Bay Yacht Agency, Annapolis, MD)

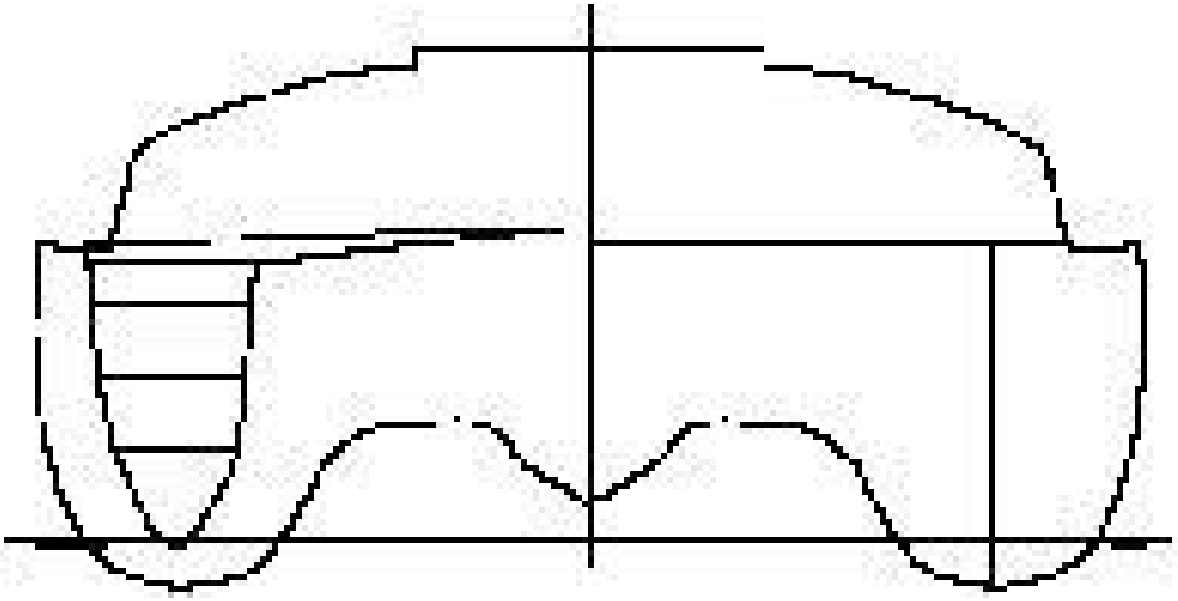
Bridge Deck Clearance

- **Height fm water to underside of bridge deck**
- **Higher is better** but:
  - increases CG -reduces interior headroom
  - increases windage -degrades boat aesthetics
- **Too low BDC causes pounding upwind**, crew fatigue and speed loss
- **Plusses**: Smooth transition hulls to BD, curved BD front, adequate distance btwn hulls
- **Too long BD** increases pitching and pounding

Bridge Deck Clearance



Newer Designs



Older Designs


Really Low BDC

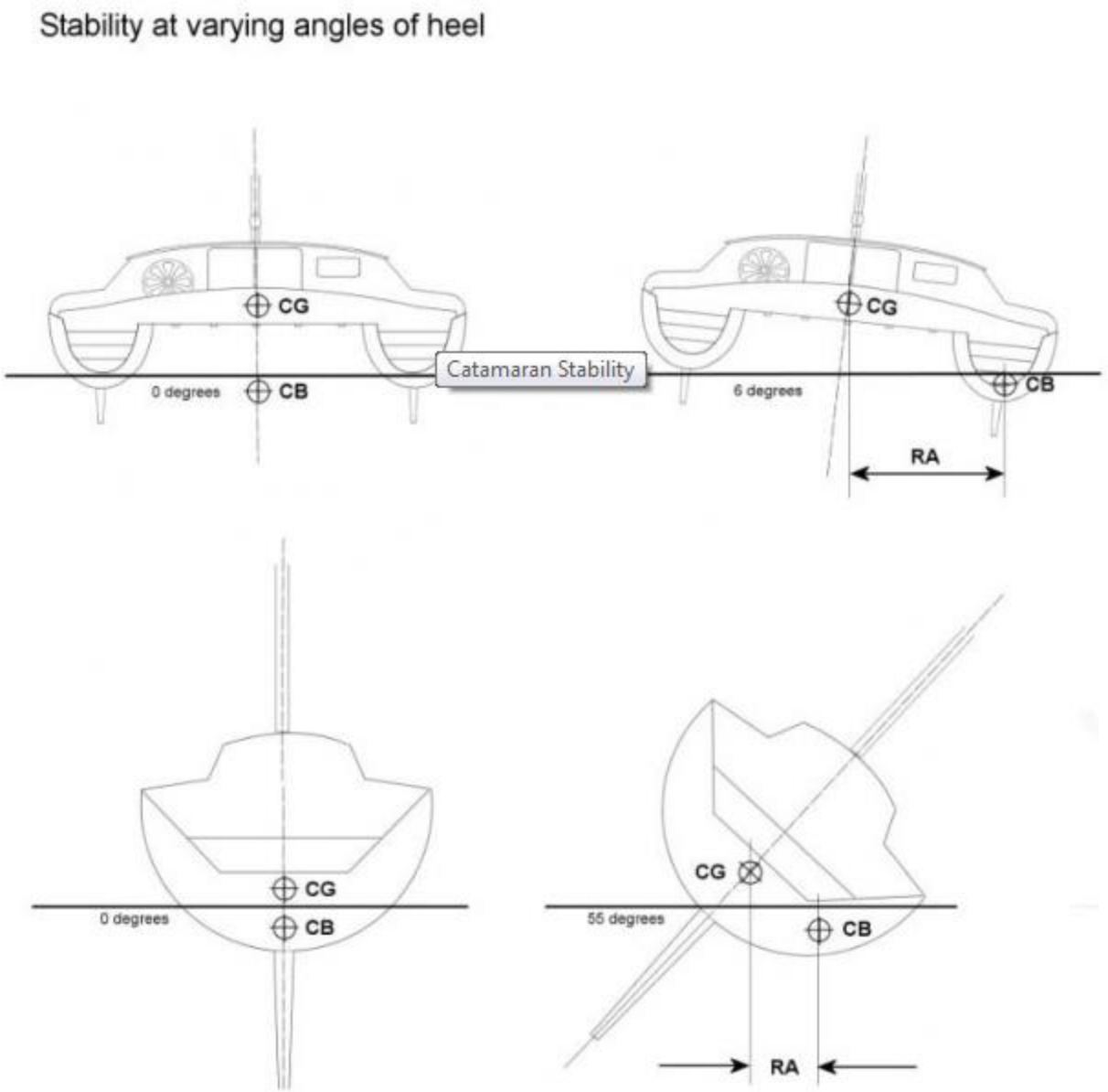

Better BDC
SF 44


Best BDC
Catana 47

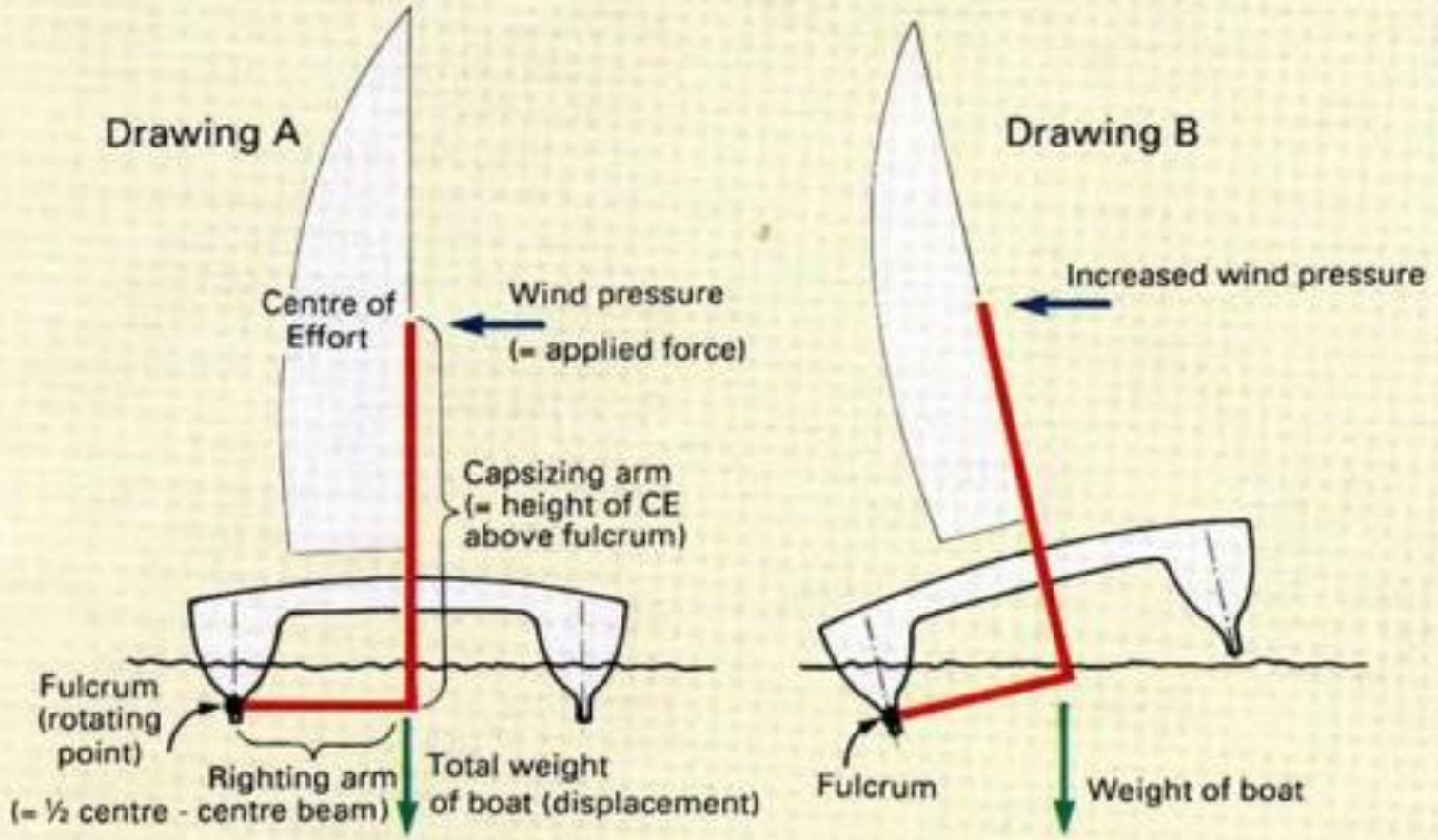
Stability (in kts) & Capsize

- **Static stability –** edge of capsize
- **Dynamic is 60% of static –** safe to sail w/ all sails up, allows for wind gusting
- **Risk of capsize -** too much sail up, >5 degrees heel, windward hull lifts
- **Reef early to prevent risk of capsize**
- **Stability depends on -** length, beam, weight, SA and CE
- **Ideal B/L ratio -** 50-55% under 50’
- Narrow hulls need more beam, less if wider

Righting Arm & Stability



Drawing 3A shows in a simple lever diagram the forces that act on a catamaran when sailing.



To Balance:

Weight of Boat x Righting arm = Wind pressure x Capsizing arm
(Righting moment) (Capsizing Moment)

If the righting moment is greater than the capsizing moment, the boat stays upright ie the boat is stable (See Drawing A)

If the capsizing moment becomes bigger than the righting moment (due to a wind increase) the boat starts to capsize (See Drawing B)

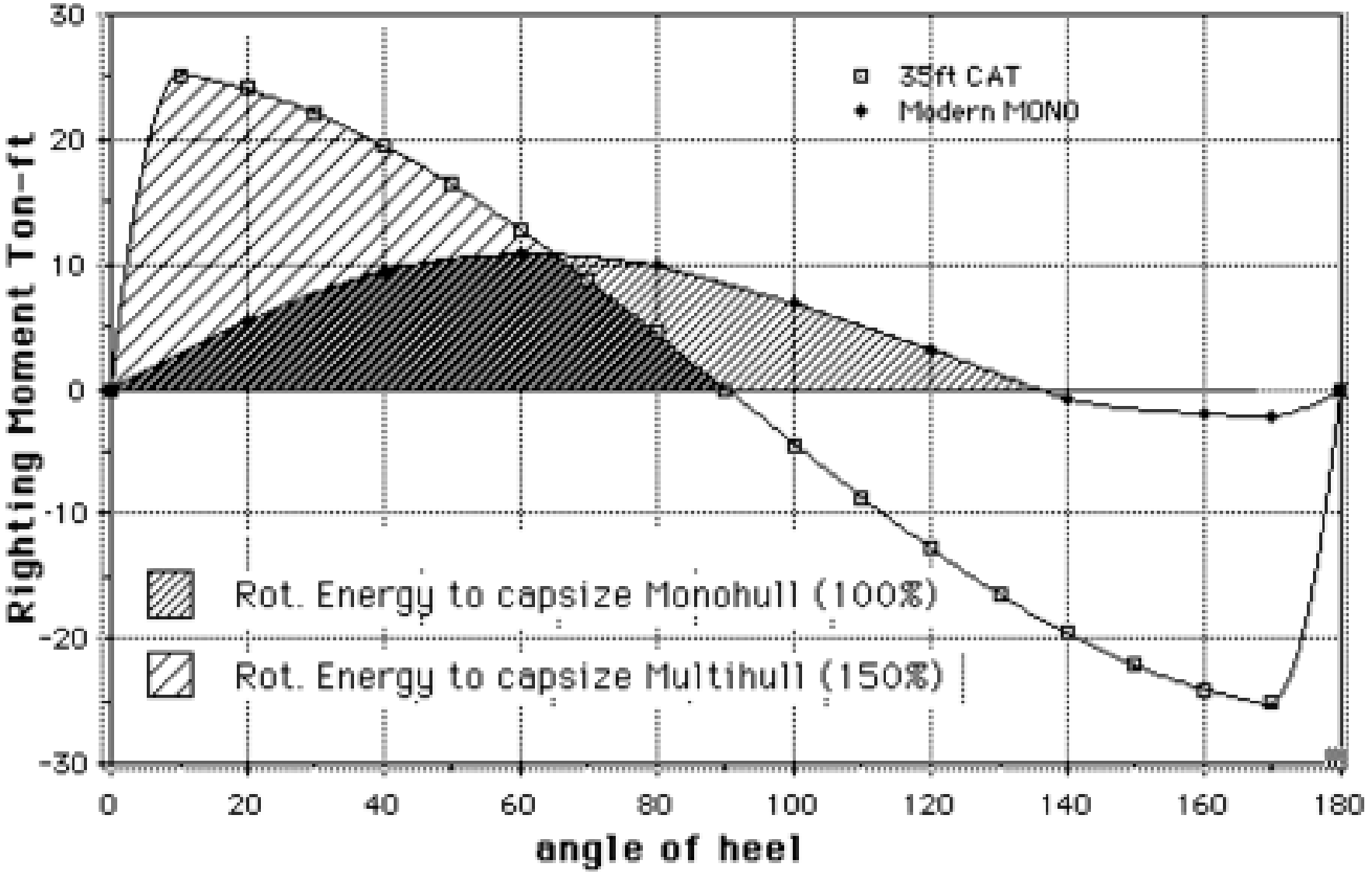


Fig. 3. Static stability curves give the energy required to capsize a modern monohull and a modern multihull.

Figure 6a)	Catamaran A	Catamaran B
Length O.A.	34' - 10.35m	35' - 10.66m
C-C Beam	11'6" - 3.50m	17' 6" - 5.33m
Weight (Lightly loaded)	9240lbs - 4200kg	6057lbs - 2750kg
Sail Area	565ft² - 52.5m²	750ft². - 69.7m²
Height of CE	20' - 6.10m	17' - 8.23m
b) Static Stability		
$14 \times \sqrt{\frac{w \times \frac{1}{2}\text{ C-C Beam}}{SA \times Ht.CE}}$	30.4knts	22.5knts
Dynamic Stability		
0.6 x Static Stability	18.2knts	13.6knts

Typical 45' first reef 18-20 kts wind

The first noticeable points from Fig.6a are that catamaran B has a wider beam than catamaran A, but carries 33% more sail and has a much lighter construction weight.

If you asked the opinion of the designer of catamaran A with reference to design B, he would say that he has been designing and building catamarans for thirty years, that his sail area to weight ratio to beam etc. had evolved to provide the maximum stability, Which adds up to sailing safety.

The designer of catamaran B, a more recent designer in the cruising catamaran field, would point out, that his design had much more beam (which is a feature of catamaran design over the last ten years) and. thus has the stability to carry the extra sail area.

Load Carrying Capacity

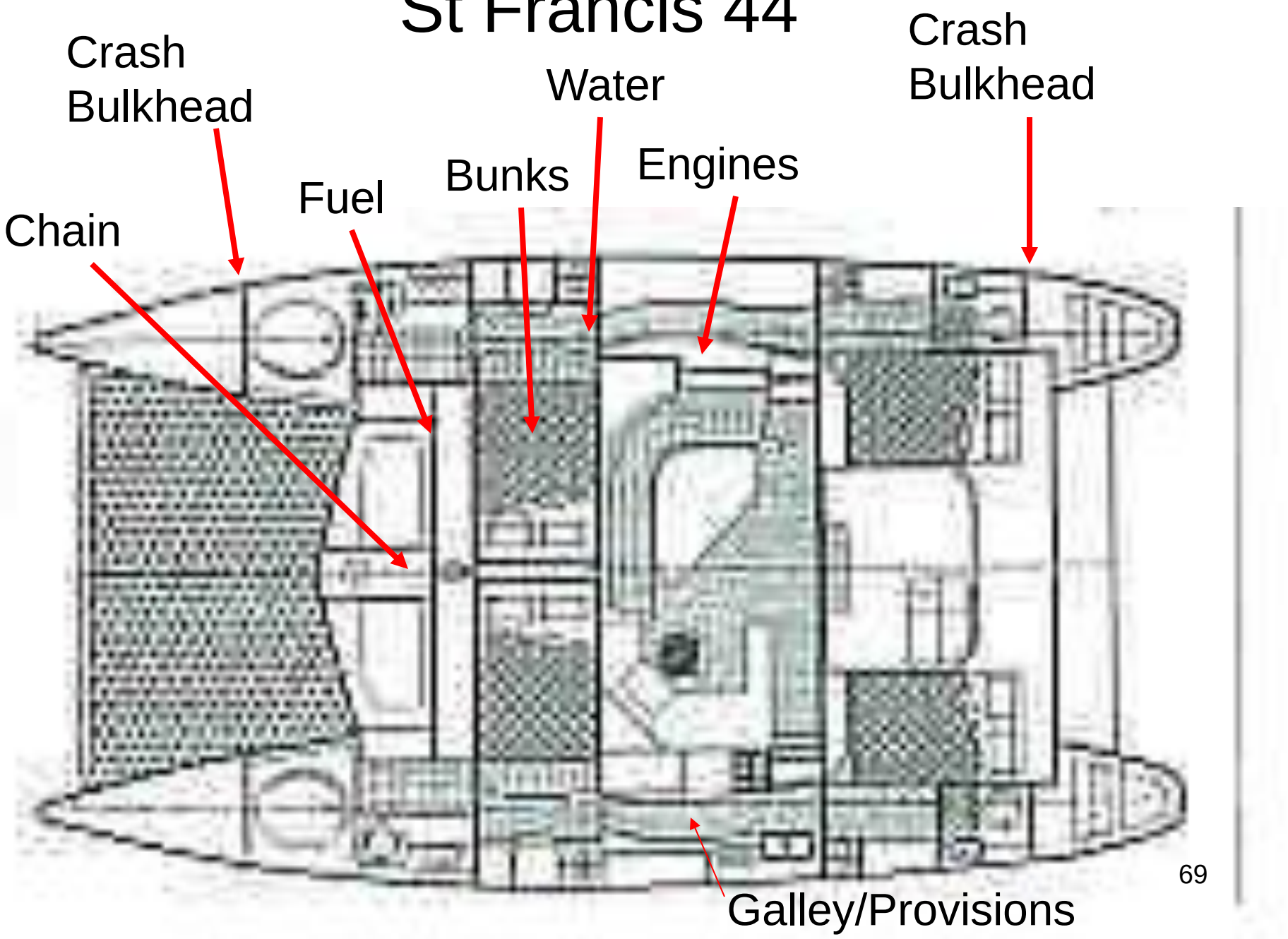
- **Cat has 10-20% less LCC than similar length modern mono**
- More LCC in similar size cats usually means fatter hulls and less speed
- **Bigger cats more LCC & liquid load**
- SF 44 has ~5,000 lbs, Bahia 46 ~9,000 lbs, Lagoon 50 ~13,000 lbs
- **Exceeding design LCC degrades performance** and reduces BDC

Comfort at Sea

- **Sail upright**, ~5 degrees heel max
- Ride over big seas in somewhat **jerky motion**, but with **little roll** even downwind
- **Reduce pitching:**
  - by removing weight from ends of boat
  - center weight F&A - engines, fuel, water, chain, provisions, etc
- **Easier to stand watch in**:
  - more room,
  - same level,
  - better visibility

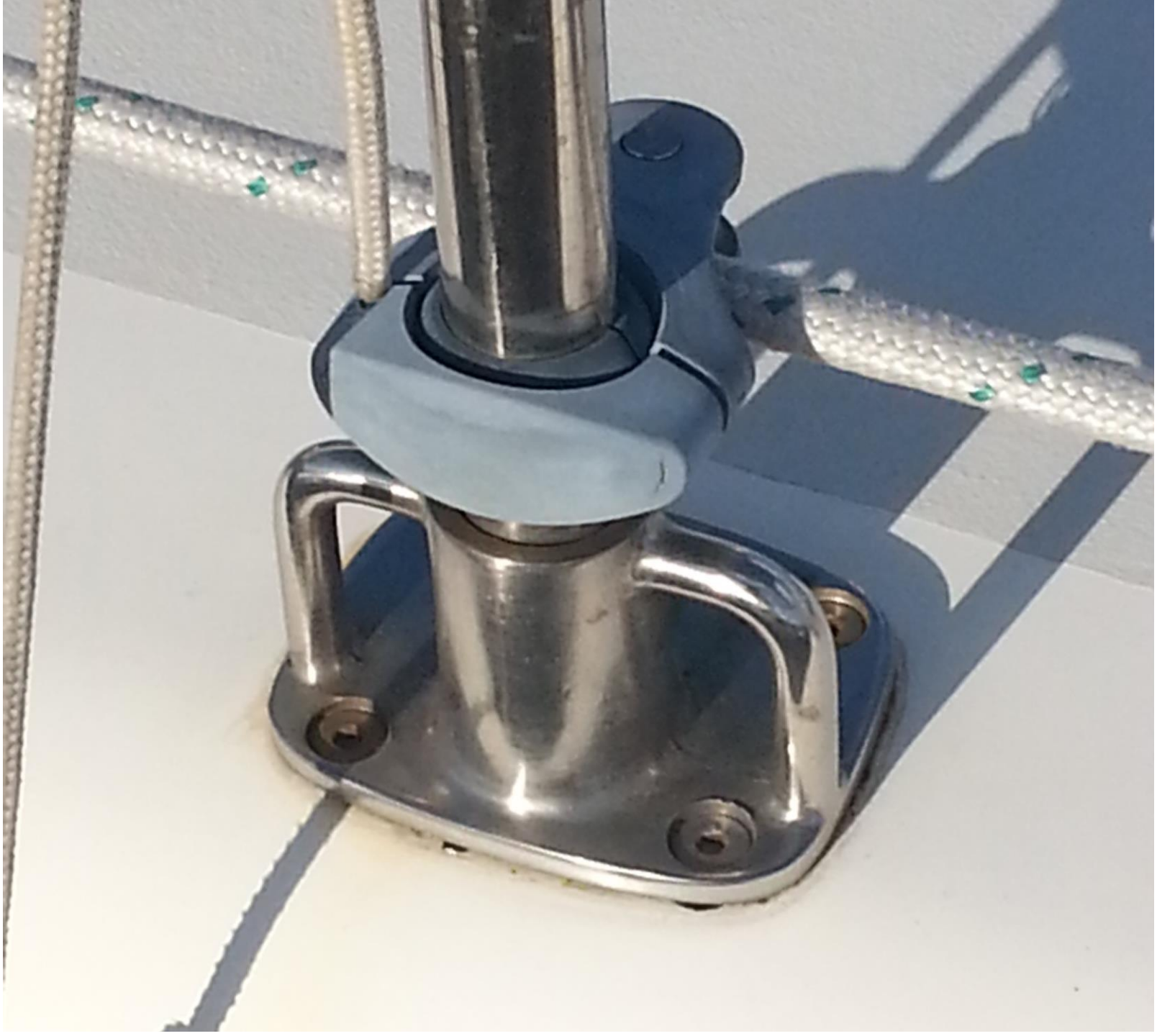

Soggy Paws
Fuel,
Chain,
Engines
Water

St Francis 44



Integrity and Quality

- **Hull construction –** core & type, solid layup or combo
- **Hull -** design, deck/bulkhd joints, gelcoat finish
- **Engine/sail drive –** make, installation
- **Deck hardware** – quality, welding, installation
- **Rig and sail plan** – design, quality fittings
- **Galley -** appointments and equipment
- **Electric & plumbing** – quality & neatness
- **Joinery work –** fine woodworking techniques



SUNSAVER-20
SUNSAVER-20

Features and Tradeoffs

Catamaran Features 1

- **Each cat is a compromise, none have all positive features**
- Keels
- Helm Positions
- Rigs
- Sails and Handling Options
- Cockpits and Covers
- Saloons
- Saloon Window Construction
- Galleys

Catamaran Features 2

- Navigation Stations
- Engines and Power Train
- Crash Bulkheads
- Ground Tackle
- Dinghy and Outboard Storage
- Insurance
- Ventilation
- Other Desirable Features

Keels - Dagger Boards vs Stubs

- **Dagger boards:**
  - “slightly higher pointing ability at speed in narrow upwind steering angle,” longer is better
  - hard to clean trunk and can get stuck
  - vulnerable to grounding and floating debris
- **Stub Keels:**
  - allow drying out on keel bottoms
  - gives extra tankage and double bottom
  - protect props & rudders from grounding damage


50'

Helm Positions

- **Two stations aft hulls:**
  - exposed to weather/sun
  - electronics UV damage
  - require duplicate binnacles, seats, electronics, steering, throttle/gear shift
  - can’t see all 4 corners from one side
- **One station in cockpit:**
  - on raised protected seat allows good vis and comfortable long periods at wheel
  - must allow view to all 4 corners for docking
  - consider how to protect from sun and weather

Helm Options

- **Fly bridge**:
  - Forward visibility problem thru headsail
  - Much higher main boom so may be difficult to access sail and stack pack closure
  - Inadequate weather protection
  - Need ladder space in cockpit, up and down
  - Windage
- **Atlantic Cats** - Sailing cockpit at mast forward with door to saloon, helm also in saloon
- **Seawind Cats** - Two steering stations in cockpit, but difficult to see forward from either


Catana
44


St. Francis 44

Elevated Helm Station

Rigs

- **< 65’ mast height** - if not ICW problem.
- **Double head stays & shrouds** – extra support for very tight cat rig
- **Hard vang** – if not topping lift chafe on main
- **Chain plate integrity** – robust 316L and substantial connection to hull
- **Wire end fittings** – mechanical or swaged
- **Rig to mast connection** – inspect carefully
- **Old rigging** - big problem on high tension cat
- **Inspect annually & before long passages**


Shrouds and
stays doubled

Sails

- **Main –** typical big full batten, big roach, 3 reefs
- **Stackpack and lazy jacks** - work great but need access to entire main boom
- **RF jib - s**maller head sail, no pole needed
- **Better rig -** two head sails plus light air sail on furler
- **Example** - SF44 700 sf main, 450 sf jib, staysail jib, Code 0 and/or big asym spinnaker
- **No backstay** – aft swept shrouds carry forward load, running backstays?
- **Solid vang** - topping lift rubs top of sail
- **HF antenna** - vertical whip, long wire difficult


Soggy Paws


FRANCIS'44
MKII


QUE PASA

Light Air Sails

- **For apparent winds 5-12 kts**
- **No poles** required!
- **Asymmetrical** for beam to down wind
  - on ‘new tech’ top down furler best
  - tacked on simple vertical line bridle
- **Code 0** for upwind to broad reach
  - on endless line small furler best
  - need bowsprit/prodder forward of head stay for tack
  - might interfere with some anchor roller trays


Just Cruizin


23A

Sail Handling

- **Winches** for:
  - main sail sheet
  - head sail sheets P&S
  - head sail furling line, stay/light air sail sheets P&S
- **Cleats** - don’t cleat the jib or main sheet!
- **Line stoppers –** for furling & main reefing lines
- **WinchRite** to power all winches
- **Mainsail reefing** - at the mast or from the cockpit

WinchRite Electric Winch Handle

Cockpit Features

- **Visibility** – good forward and aft, multiple comfortable look out positions underway
- **Saloon/cockpit door -** strong, weather-proof, lockable
- **Seating** – comfortable, sleep able
- **Flooring** – good tread and draining
- **Access** - easy entry/exits
- **Good stormy weather protection**

Good Visibility Forward


Solid lockable
sliding glass doors

Cockpit Covers

- **Hard top:**
  - best if well thought out
  - strong rain/sun cover
  - access to full boom/sail length
  - rain water collection through hoses to deck fills
  - mounting area for solar panels (F&A), need to minimize boom shading
- Effective removable fwd **wind screen**
- **Side covers -** for rain/spay protection


Clear view
forward


KALAKUTA
Exposed helm station


Lightly supported top
but water collection


Difficult to
see forward


Hard top w/
side & rear
panels


Basic soft top
SJ FRANCIS 44

Saloons

- My requirements:
  - **3 entrance/exits** - cockpit & to both hulls
  - **big navigation station/office** – electronics, circuit breaker panel, table space, comfortable seat
  - **big dinner table** - with comfortable seating
  - **seating** – comfortable, useable as bunk, storage for batteries & emergency gear
  - **good visibility** - forward and to sides
  - **very strong door construction**
  - **good lighting** – LED and well spread out
  - **galley** – enough room and counter space


GLOBE SAILOR

Galley Up vs Galley Down

- **My requirements:**
  - **counter top** - 10-15 lf food prep space, near sink & stove
  - **storage lockers** - as many as possible
  - **big refrig and freezer** - refrig same level, 10+3 cuft
  - **appliances -** stove, microwave, toaster, sink, etc
  - **big food pantry** - nearby, easily accessed
  - **pass through** - if down convenient to saloon
- Under about 45’ hard to fit big galley in saloon
- Galley down gets cooking/dish/trash clutter out of main saloon
- “Light impact” on watch in cockpit?


Small
Galley


Smaller
Galley


Big
Galley
Down

Looking aft

Navigation Stations

- Best **in main saloon** forward corner P or S
- **View out** - at least 180 degree forward
- **Seating -** forward facing, comfortable for watch standing
- **Big table surface -** doubles as office space
- **Electronics** – viewable, wiring accessible
- **Circuit breaker panel** -
  - nearby and visible from cockpit door
  - rear wiring easily accessible
- **Chart & book stowage?**


Small
Navigation
Station/Office


Smaller
Navsta


Raymarine
Better
Navsta

Big Nav Station

Saloon Windows & Hatches

- **Construction/installation** - look carefully
- **Opening hatches** - big plus if properly done
- **Sloped:**
  - stronger against big wave slap
  - less windage**,** more aerodynamic (TCyclone issue)
  - sun covers or dark glazing – needed for heat reduction in port
- **Vertical:**
  - less sun heat without covers
  - vang usually not possible
  - more windage esp in TCyclone


QUE PASA

Engines and Power Train

- **Two small vs one larger diesel:**
  - each ½ hp of single engine
  - motoring one uses ½ fuel for similar speed
  - using two, same fuel but ~ 2 kts faster
- **Angled straight shaft vs sail drives:**
  - sail drives most common but some corrosion issues
  - straight shaft easier to protect, more difficult install
- **Placement in hulls**:
  - center vs aft – aft weight increases pitch
  - vertical sail drive vs angled inboard
- **Access**:
  - from exterior aft deck, under aft berth, internal door, cover
  - room to perform routine maintenance easily?
  - how to remove/overhaul engines?


YAMAHA

St Francis 44


Custom 60’


DULCE
PORTLAND
AUSTRALIA


YANMAR

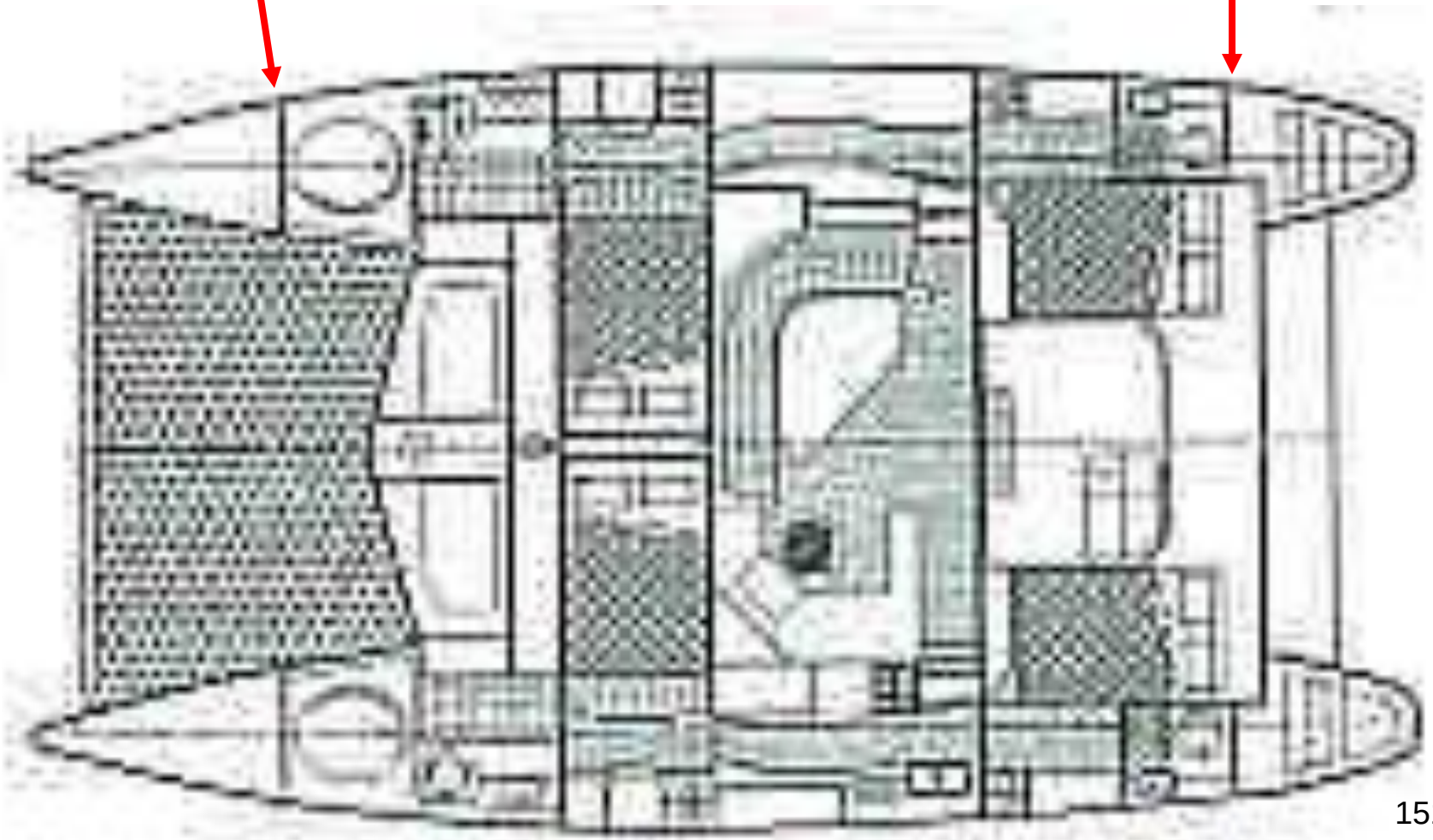
Crash Bulkheads

- **Crash bulkheads**:
  - two fwd and two aft typical
  - inspect integrity and waterline location
  - fwd good place for holding tanks providing double hull protection
  - stowage - only light weight items fwd and aft
- **Flotation** - many cats will float if holed due to light weight and cored hulls, ask dealer
- **Loading** – caution, overloaded cats may not float!

St Francis 44

Crash Bulkhead

Crash Bulkhead




DWL


Holding
tank under


FASHIONABLE
OPTICAL

Ground Tackle

- **Anchor roller - strong w/ big modern anchor**
- **Two anchors** – two rollers better than one
- **Windlass –** robust, on deck mount, up/down & wireless remote control
- **Chain routing**: (windlass to roller)
  - salt water wash down
  - easy bridle attachment/removal
  - see chain lead at water during retrieval
- **Proper chain locker**:
  - mount windlass on deck for longer chain fall
  - deeper prevents chain castling problem
  - sufficient rode type/length for cruising grounds

Dinghy and Outboard Storage

- **Dinghy davits:**
  - stowed on davits U/W very convenient
  - best on high, 6'+, strong davits, w/o fuel or engine
  - low davits dangerous at sea & in port theft risk
- **Outboards** - stowed close by on aft rail, use integrated lift to lower/raise
- **Locker** – vented, nearby for fuel, oil and gear
- **10.5' RIB w/ 15 & 5 HP OB:**
  - good dinghy type, size & HP choice
  - engine backups esp is same brand
  - 15 HP for long fast runs w/ dive gear or 4 pers
  - 5 HP for in port fuel economy, uses same fuel can


YAMAHA
15
IAB


EXIT STRATEGY


High lightweight
arch w/ davits

High heavier SS arch with davits

High but heavy, strong SS arch

Ventilation

- **Deck hatches –** more is better, min 1 ea space, SF 44 has 14 opening deck hatches
- **Side opening ports –** ensure integrity
- **Saloon vents** – cabin top and sides best
- **Escape hatches** - a must in each hull, look carefully at integrity, placement and access
- **Fans –** Caframo best option, reliability, cost, volume, and cleaning
- **Air conditioning** – (only needed at dock)
  - permanent installation expensive, inefficient, space
  - 7K Btu window AC is cheap and efficient, location?

Caframo Ultimate 757 12V 2-Speed 7" Fan Direct Wire White

About $50


Good escape
hatch height for
ventilation


Escape hatch too low, flooding danger

Insurance

- **Cost of policy:** (shop carefully)
  - underwriter's perceived risk
  - cost to settle claim, adjuster travel
  - boat value
  - deductible
  - agreed value vs actual cash value
- **Ask hard questions** - 'what's not covered' list
  - tropical cyclone exclusion zones, hurricane plan?
  - pirate/terrorist/war zone/country exclusions
  - consequential damage and maintenance coverage
  - on mooring buoy coverage
- **Claims reputation –** must ask cruiser clients

Other Desirable Features

- **Bunks –** min two, amidships queens P&S
- **Workshop -** storage space for lots of tools, spares
- **Lifelines** - strong w/ tall stanchions, low stretch line vs wire vs plastic coated wire
- **Atwartships & cockpit access-** full width walkway behind cockpit
- **Side decks** - flat & wide leading forward
- **Deck lockers –** big, lots esp centered F&A, life raft storage locker
- **Ceiling height** - adequate in saloon, cockpit & hulls

Good life raft storage

Internet References

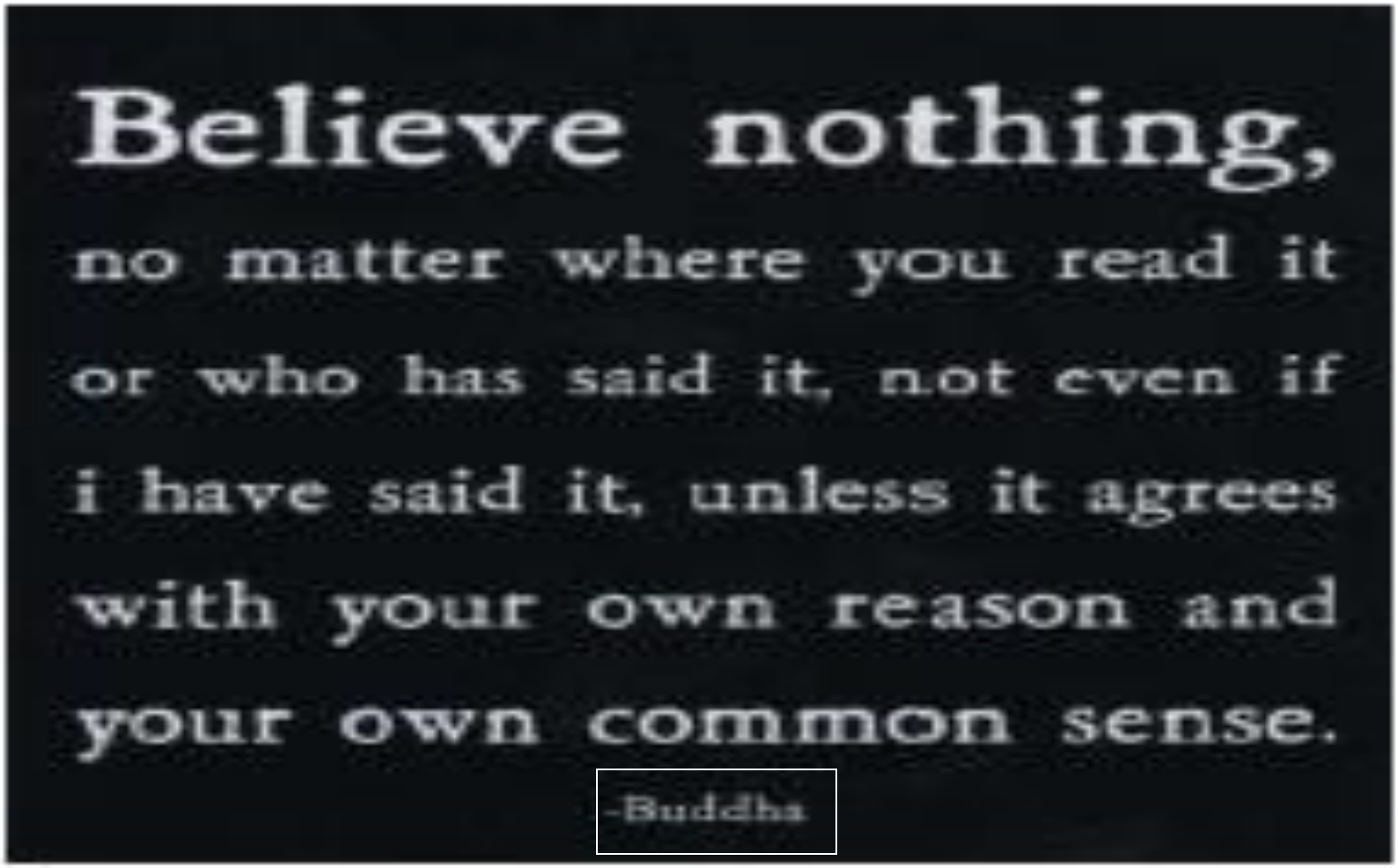
- Manufacturer websites
- Catamaran forums
- “Good Cat Bad Cat” article
- www.MultihullDynamics.com
- www.Aeroyacht.com
- www.2Hulls.com
- www.Multihulls-world.com
- www.Sailboatdata.com
- www.Wharram.com
- http://www.wherethecoconutsgrow.com/2015/09/what-marine-insurance-companies-dont-want-you-to-know/

Book References

- Catamarans :The Complete Guide for Cruising Sailors/Every Sailor's Guide – Gregor Tarjan 4 stars
- The Sailor's Multihull Guide – Kevin Jeffrey 4 stars
- Cruising in Catamarans/Communique- Charles Kanter 3 stars
- The Cruising Multihull – Chris White 4 star
- Others
- **None really good!,** some dated, some better than others, some poorly written, see Amazon reviews

Cautions

- Not everything you read on the internet or hear as ‘expert opinion’ is true!
- Brokers and dealers are motivated to tell you what is wrong with the competition IOT sell their boats.
- Blue water cruisers can’t afford cheap gear so research, research, research.
- If it doesn’t pass the ‘eye test’ be suspicious and ask hard questions!



Disclaimer!

Another version of the eye test!

Modern equivalent is that not everything you read on the internet is true!

The End

Dave & Sherry McCampbell
www.SVSoggypaws.com/Presentations