

PONTOON KIT PACKING LIST

PART NO.	QTY.	NAME	PACKED	BACK ORDERED
TF-1	1	Spray deck front spar, 78-1/2" (1-5/8" dia.)		
TF-2	1	Spray deck rear spar, 78-1/2" (1" dia.)		
TP-2	2	Inboard rear spar sleeve, 72"		
TF-3	2	Mid-diagonal strut, 65-1/2"		
TF-4	2	Rear diagonal strut, 45-1/2"		
TF-5	2	Front diagonal strut, 43"		
TF-6	2	Axle strut, 37-3/8"		
TF-7	2	Lower diagonal strut, 35"		
TF-8	1	Front spar mount strut, 23-1/2"		
TF-9	2	Rudder pedal, 11"		
T-36	4	Long rib tube, 87-1/2"		
SF-1	2	Water rudder		
SF-2	4	Front spar attach plate		
SF-3	4	Rear diagonal attach plate		
SF-4	4	Rudder pedal hinge bracket		
SF-5	4	Pontoon front attach bracket		
SF-6	4	Pontoon rear attach bracket		
SF-7R	1	Rudder actuator arm, right		
SF-7L	1	Rudder actuator arm, left		
SF-8	2	Rudder hinge assembly		
SF-9	2	Mid-diagonal attach bracket		
S-10	8	Pulley block		
S-29	9	Universal channel bracket		
SB-30	2	Front diagonal attach bracket		
SB-48	4	Rib end plug		
M-2	4	Swivel		
M-4	28	Safety ring		
M-7	12'	3/16" bungee cord		
M-12	10"	Cable casing		
M-29	2	Flat tang		
M-35	18'	1/16" cable, uncoated		
	2	3" wood dowel for 1" x .058 tube		
	2	Sea Hawk pontoon		
	1	Spray deck		
	1	Contact cement, 3M #1357, 5 oz. tube		
	1	Silicone rubber adhesive sealant, 2.8 oz. tube		
	1	Rib profile, spray deck		
	1	Assembly manual, pontoon kit		
	1	Structural parts I.D. plan		
	1	AN hardware I.D. plan		

(continued)

PONTOON KIT PACKING LIST (cont.)

PART NO.	QTY.	NAME	PACKED	BACK ORDERED
	8	AN3-6A		
	4	AN3-10A		
	4	AN3-21A		
	2	AN3-16		
	1	AN3-52		
	12	AN4-6A		
	1	AN4-7A		
	16	AN4-14A		
	2	AN4-15A		
	12	AN4-16A		
	2	AN4-17A		
	2	AN4-22A		
	1	AN4-30A		
	8	AN4-15		
	2	AN4-16		
	4	AN4-24		
	2	AN42B14A		
	2	AN42B20A		
	2	AN43B16A		
	4	AN115-16		
	5	AN100-C3		
	10	18-1-C		
	2	DG-3		
	4	AN210-1A		
	4	AN393-15		
	5	AN394-45		
	2	NAS43DD3-24		
	32	MD43BS		
	12	MD46BS		
	3	AN350-1032		
	15	AN350-428		
	20	AN365-1032A		
	50	AN365-428A		
	40	AN960-10		
	8	AN960-10L		
	110	AN960-416		

**KASPERWING®**

**180 - B**

**PONTOON OPTION  
ASSEMBLY & OPERATING  
INSTRUCTIONS**

## INTRODUCTION

THIS PONTOON KIT HAS BEEN CAREFULLY DESIGNED AND EXTENSIVELY TESTED FOR WELL OVER A YEAR, ESPECIALLY TO FIT YOUR KASPERWING. PLEASE ALLOW YOURSELF ENOUGH TIME TO DO A PROPER JOB OF ASSEMBLY AND INSTALLATION. THE ENTIRE PROCESS SHOULD TAKE ABOUT 16 MAN-HOURS OR FIVE OR SIX EVENINGS OF SPARE TIME. FIRST READ THROUGH THE INSTRUCTIONS COMPLETELY BEFORE YOU BEGINS THE STEP-BY-STEP SEQUENCE. DO NOT ATTEMPT TO TAKE SHORT CUTS TO SAVE TIME. THE REASON FOR MANY OF THE STEPS WILL NOT BECOME APPARENT UNTIL SEVERAL STEPS LATER OR UNTIL THE ENTIRE JOB IS COMPLETE. BEFORE GETTING STARTED, USE THE PACKING LIST AND HARDWARE IDENTIFICATION PLAN TO TAKE A COMPLETE INVENTORY OF ALL THE NECESSARY PARTS AND HARDWARE. CALL OR WRITE US IMMEDIATELY IF YOU DISCOVER ANY PARTS ARE MISSING. BE SURE YOU ALSO HAVE ALL THE TOOLS AND MATERIALS ON THE TOOL LIST BEFORE PROCEEDING WITH THE ASSEMBLY. IF YOU WORK SLOWLY AND STEADILY, YOU WILL HAVE A HIGH-PERFORMANCE AIRCRAFT CAPABLE OF OPERATING FROM WATER OR LAND AND IT IS LIKELY YOU WILL STAY COMPLETELY DRY DOING IT. OCEANS OF FUN AWAIT YOU!

## TOOLS REQUIRED

3/8" AND 7/16" NUT DRIVER, SOCKET OR RATCHET WRENCHES

3/8" AND 7/16" OPEN END OR BOX WRENCHES

PLIERS

HAMMER

CENTER PUNCH

1/8", 9/32" AND 1/4" DRILL BITS

POP RIVET GUN

1/4" DRILL MOTOR

FLAT FILE

1/16" SWAGING TOOL

CABLE CUTTER

STRAIGHT EDGE RULER

60-100 GRIT SANDPAPER, 1 SHEET

2 SMALL DISPOSABLE BRUSHES, 1-INCH WIDE

PENCIL

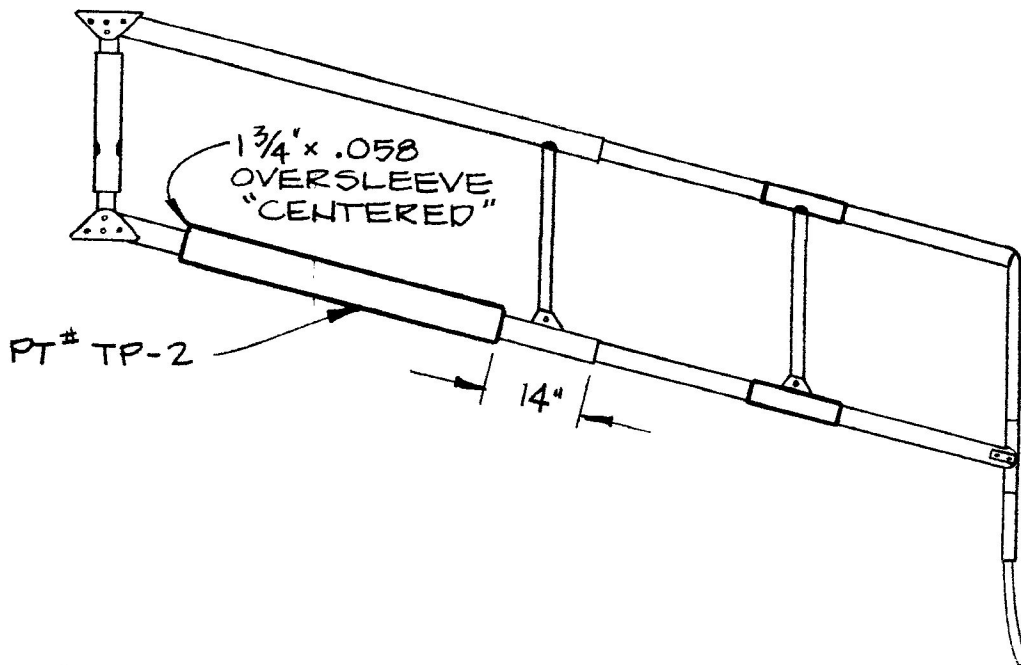
MASKING TAPE

STEP #1

REMOVE ENGINE, EXHAUST AND LANDING GEAR ASSEMBLIES FROM UNDERCARRIAGE FRAME OF KASPERWING. REMOVAL WILL MAKE FITTING THE PONTOONS MUCH EASIER. THIS CAN BE DONE MOST READILY BY DISCONNECTING THROTTLE, CHOKE, IGNITION WIRES, FUEL LINES AND EXHAUST FROM THE ENGINE. REMOVE THE 4 BOLTS AT THE FRAME END OF ENGINE MOUNT HORIZONTAL AND DIAGONAL STRUT TUBES AND LIFT THE ENTIRE ENGINE, PROP AND MOUNTING ASSEMBLY AWAY FROM THE FRAME.

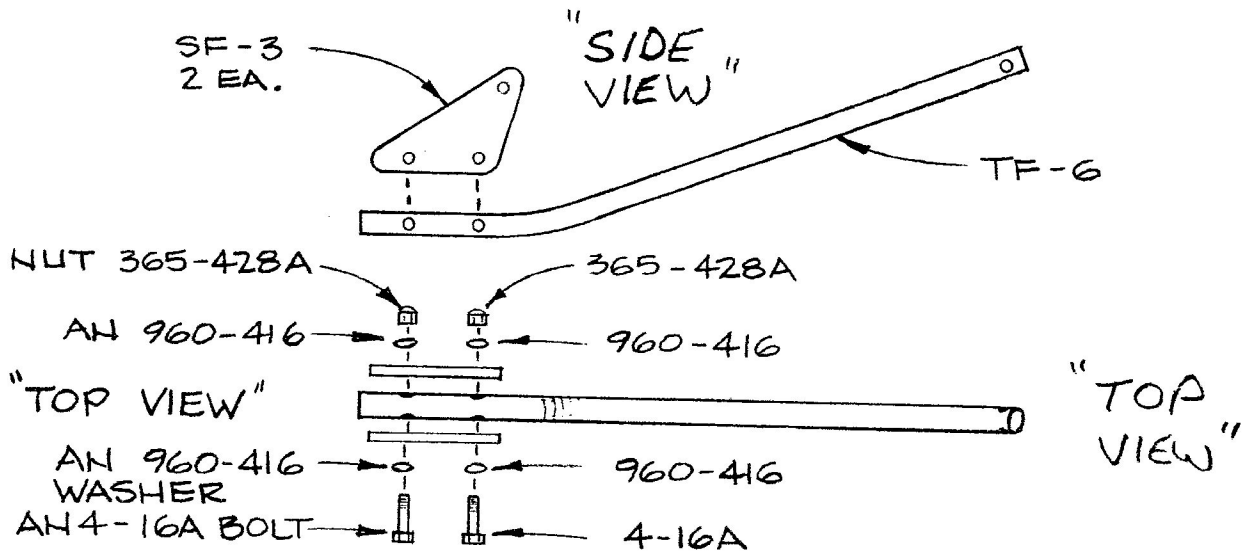
STEP #2

IT IS MANDATORY THAT YOU REMOVE THE INBOARD REAR SPARS FROM THE WING AND INSTALL A 72" LONG X 1 3/4" DIAMETER OVERSLEEVE, PART #TP-2, TO STRENGTHEN EACH WING. SLIDE SLEEVE ON OVERSLEEVE, PART #TP-2, TO POSITION AS SHOWN. SECURE IN PLACE BY WRAPPING ENDS WITH TAPE OR INSTALL A POP RIVET NEAR ONE END. IT WILL HELP TO SPRAY A LITTLE WD-40 INSIDE SLEEVE PRIOR TO INSTALLATION. REASSEMBLE WING AND TIGHTEN BOLTS SECURELY.



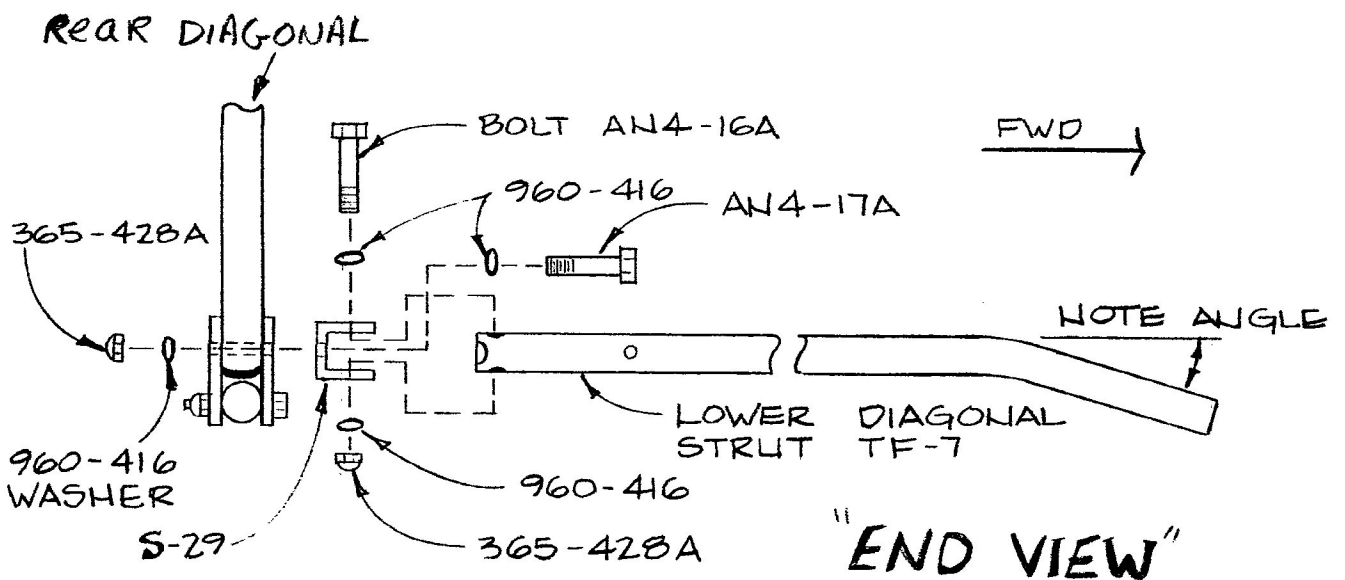
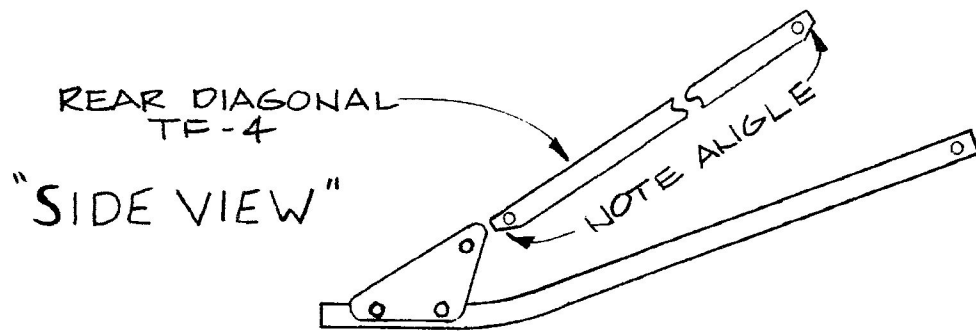
STEP #3

FORM A PAIR OF PONTOON REAR PYLON ATTACHMENT ASSEMBLIES BY JOINING TOGETHER THE STRUTS AND BRACKETS WITH THE PROPER HARDWARE AS SHOWN.



STEP #4

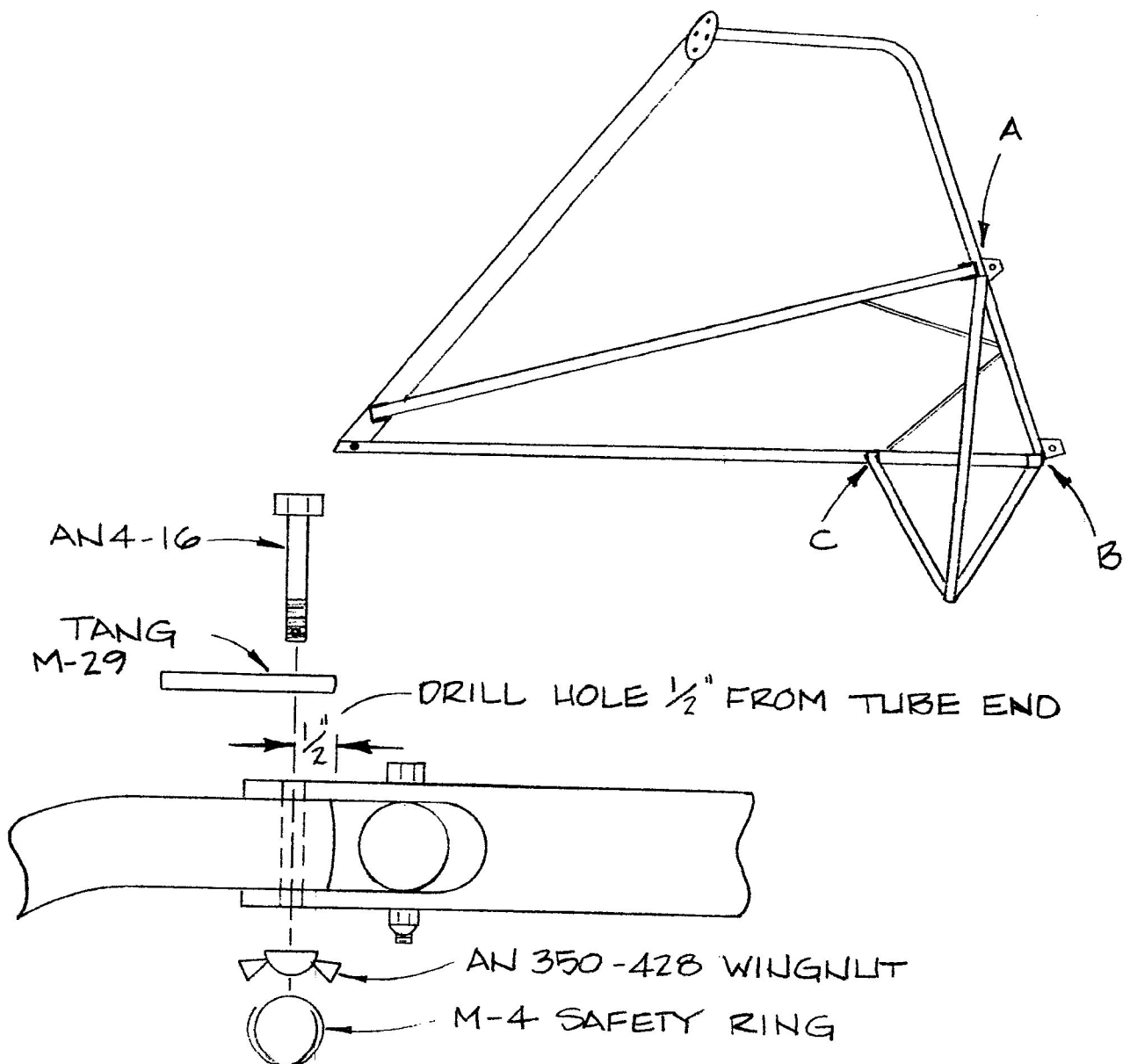
PLACE REAR DIAGONAL STRUT IN POSITION AND SECURE WITH BOLT AND BRACKET. ATTACH LOWER DIAGONAL TO BRACKET #S-29 AS SHOWN.



MAKE 1-ASSY RIGHT, 1-ASSY LEFT

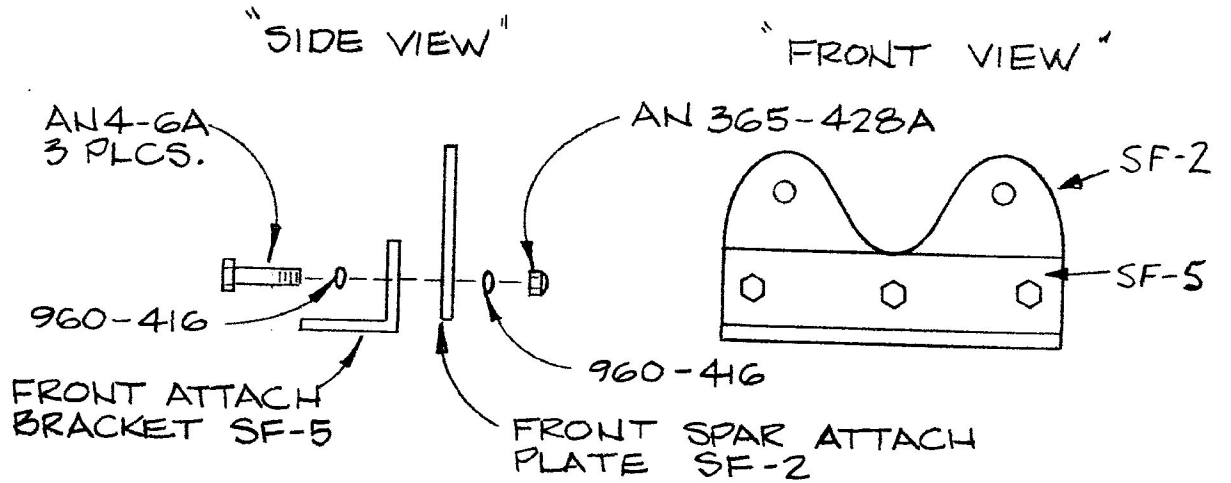
STEP #5

ATTACH PONTOON PYLON ASSEMBLY TO UNDERCARRIAGE FRAME AT POINTS A, B AND C WITH AN HARDWARE AS SHOWN. TIGHTEN WINGNUTS ONLY FINGER TIGHT FOR NOW. PLACE A PENCIL MARK  $1/2$ " FROM END OF TUBE ON TOP AND BOTTOM OF LOWER DIAGONAL STRUT. PLACE STRUT END IN BRACKET AND CLAMP OR HOLD IN POSITION FOR MARKING. BE SURE STRUT END AND PENCIL MARKS ARE CENTERED UNDER HOLES IN BRACKET END. MARK AND CENTER PUNCH TOP AND BOTTOM OF STRUT END FOR DRILLING. DRILL A  $1/4$ " DIAMETER HOLE IN END. DE-BURR AND REINSTALL STRUT AND SECURE WITH BOLT, WINGNUT AND SAFETY RING.



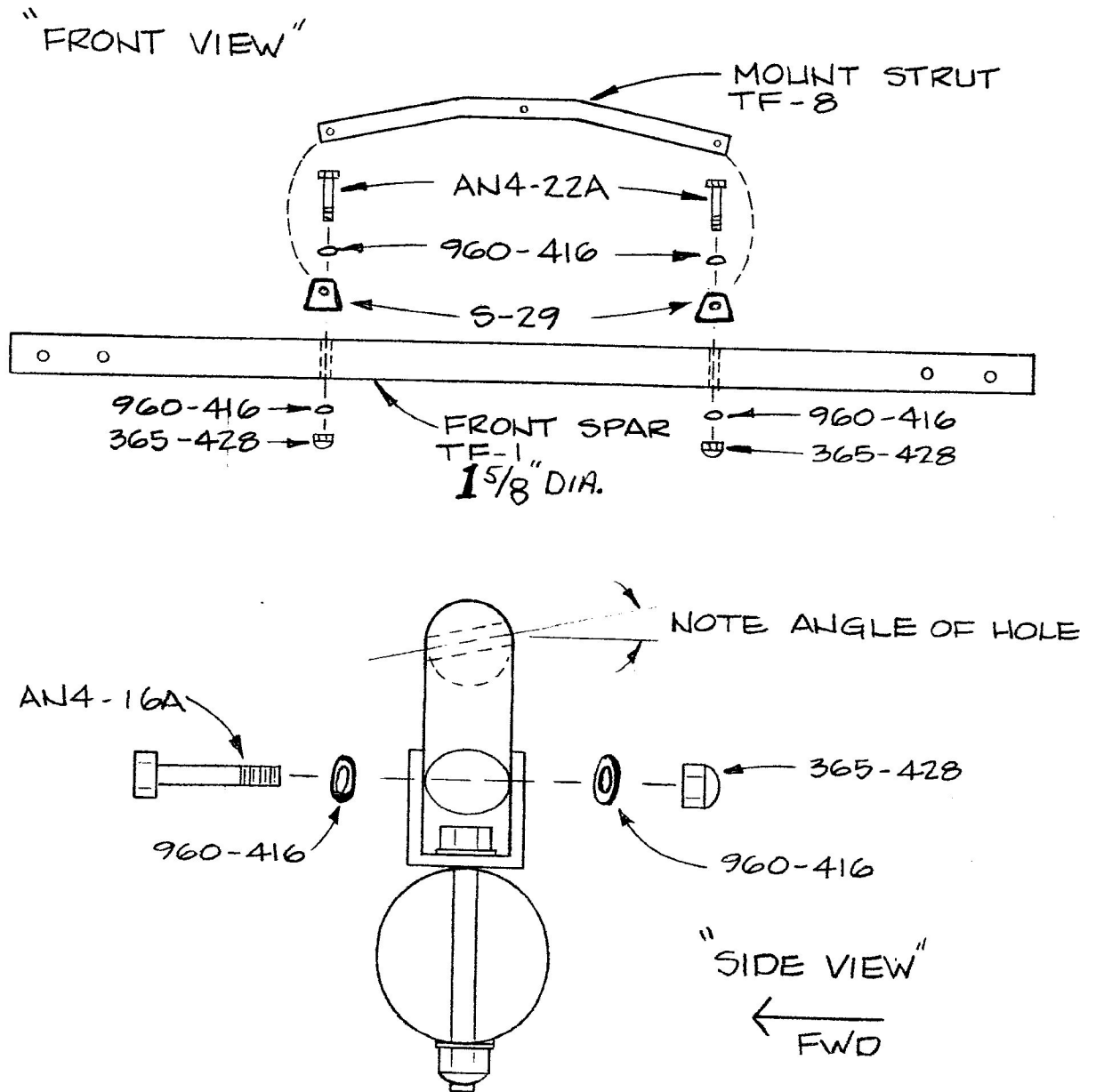
STEP #6

ASSEMBLE 4 SETS OF PONTOON FRONT MOUNT BRACKET ASSEMBLIES AS SHOWN.



STEP #7

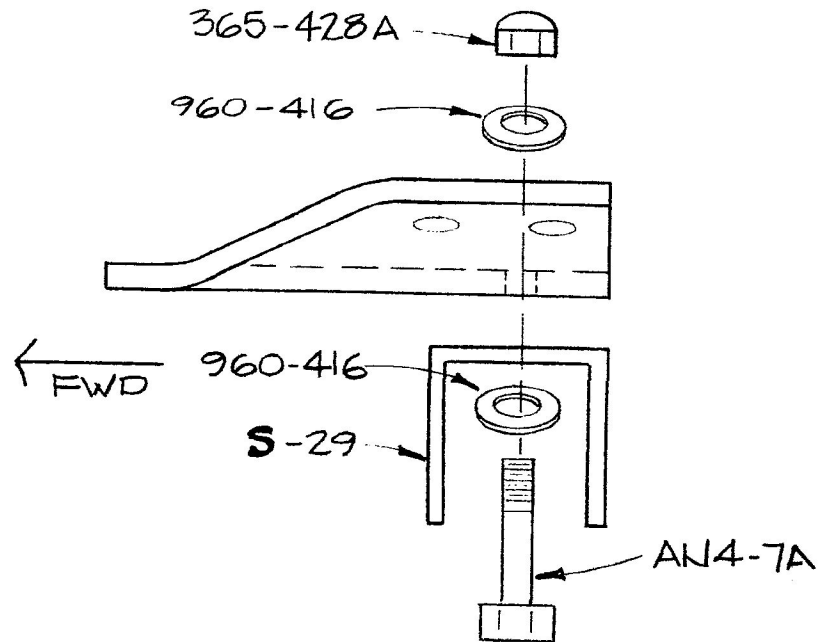
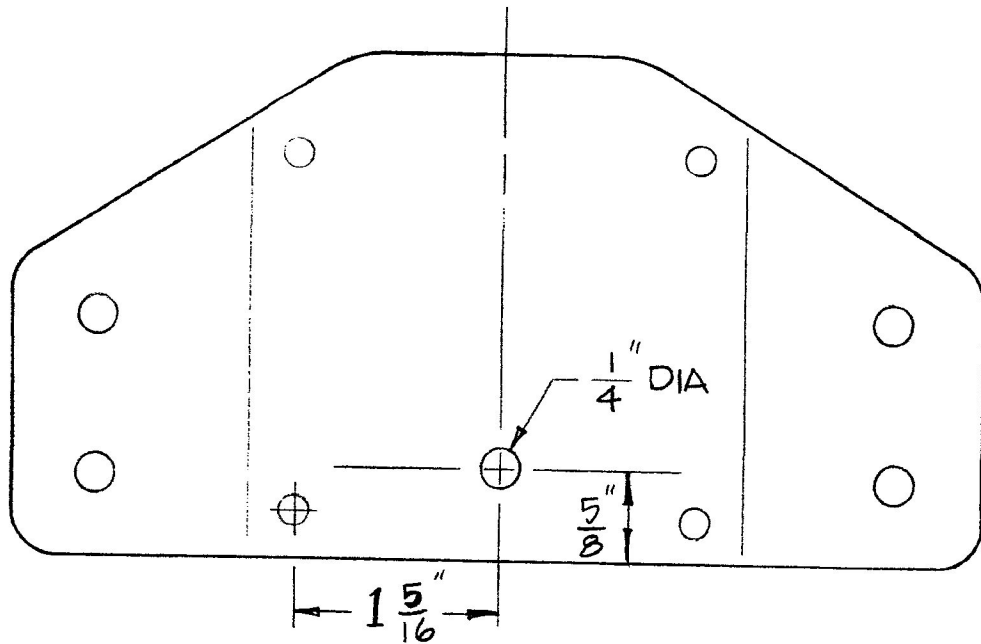
ATTACH FRONT SPAR MOUNT STRUT TO PONTOON FRONT SPAR.





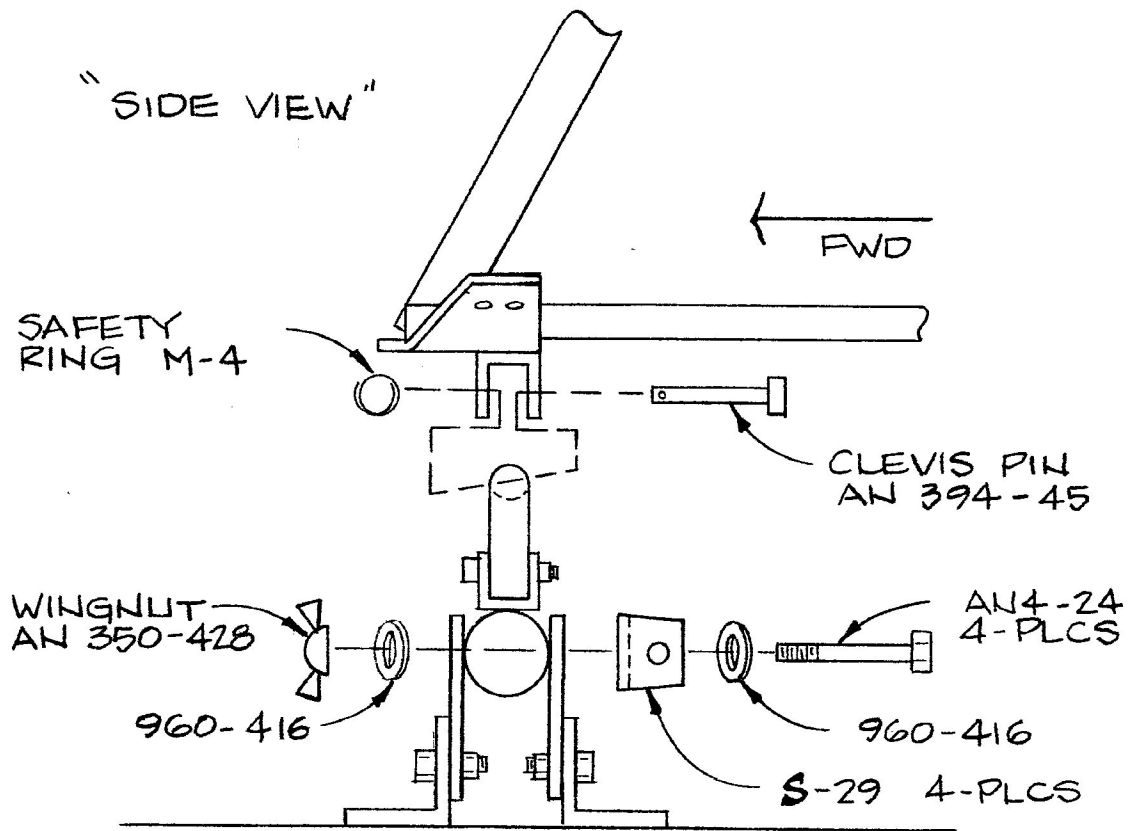
STEP #8

REMOVE FLYING WIRE PLATE FROM FRAME. LAY OUT AND DRILL HOLE IN POSITION SHOWN. REMOVE ANY BURRS FROM HOLE WITH FILE. ATTACH BRACKET #S-29 TO BOTTOM OF PLATE AS SHOWN. REATTACH PLATE AND BRACKET ASSEMBLY TO BOTTOM OF FRAME. TIGHTEN NUTS SECURELY!



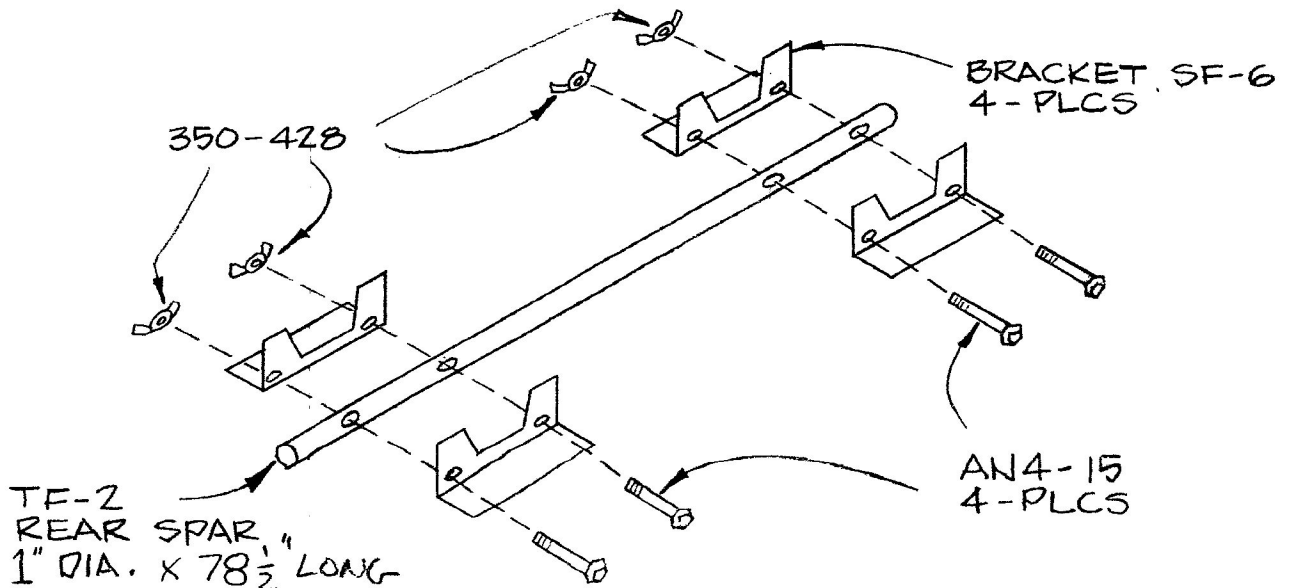
STEP #9

ATTACH PONTOON FRONT SPAR TO PONTOON FRONT MOUNT ASSEMBLIES AS SHOWN. CONNECT ENTIRE ASSEMBLY TO BOTTOM OF FRAME WITH CLEVIS PIN. TIGHTEN WINGNUTS FINGER TIGHT FOR NOW.



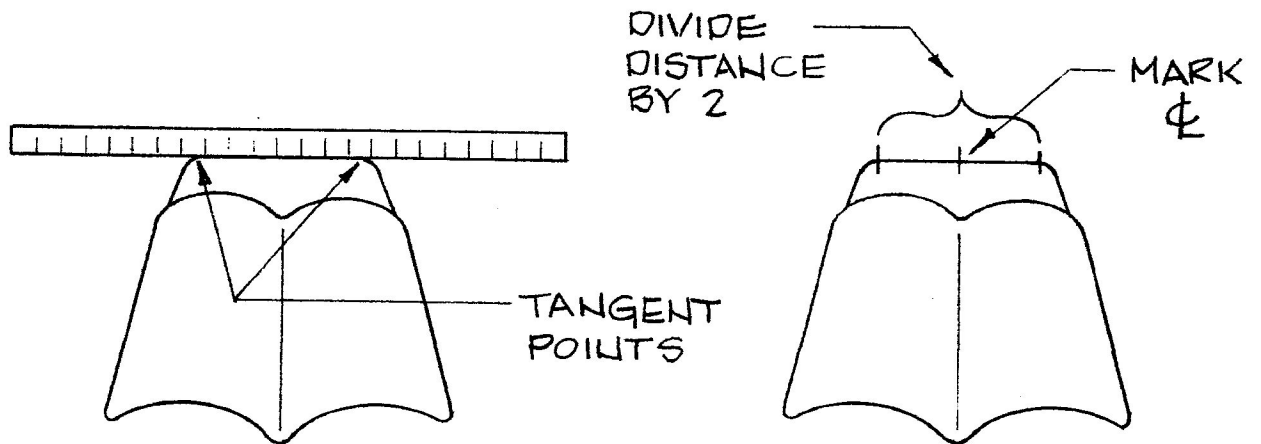
STEP #10

ATTACH PONTOON REAR ATTACH BRACKETS TO PONTOON REAR SPAR WITH TEMPORARY BOLTS AND WINGNUTS AS SHOWN. TIGHTEN WINGNUTS ONLY FINGER TIGHT.

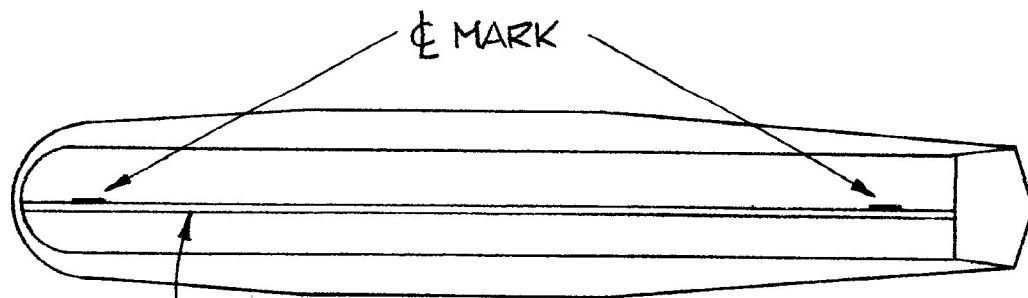


STEP #11

LAY A STRAIGHT EDGE PERPENDICULAR ACROSS THE FRONT AND BACK END OF EACH PONTOON. PLACE A PENCIL MARK AT THE TANGENT POINTS OF THE PONTOON AND STRAIGHT EDGE AS SHOWN. CAREFULLY MEASURE AND DIVIDE IN HALF THE DISTANCE BETWEEN THE OUTER PENCIL MARKS. MEASURE AND PLACE A THIRD PENCIL MARK ON THE PONTOON LOCATING THE CENTERLINE.



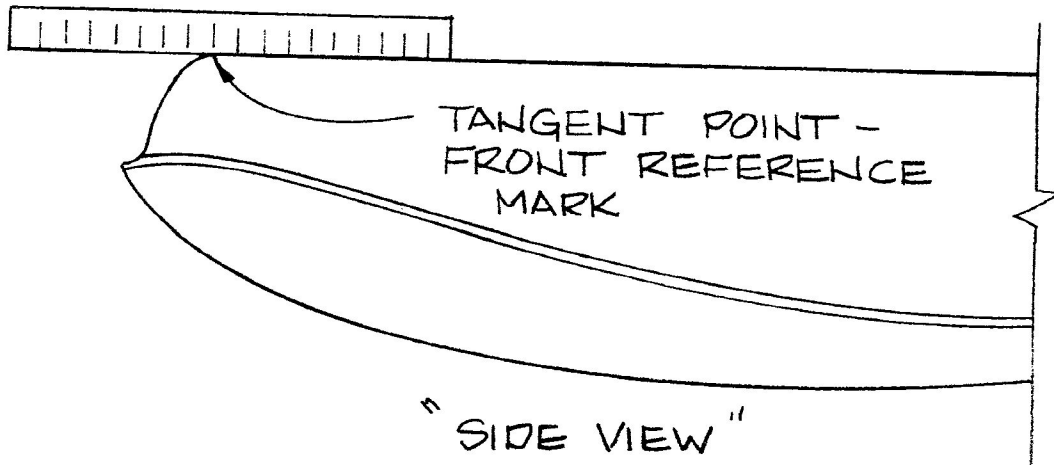
ATTACH A STRIP OF MASKING TAPE LENGTHWISE ALONG THE FULL UPPER SURFACE OF THE PONTOON, LAYING OUT THE FORE AND AFT CENTERLINE. STRETCH THE TAPE TAUT AND BE SURE THE PROPER EDGE OF THE TAPE IS ALIGNED NEXT TO THE CENTERLINE MARK.



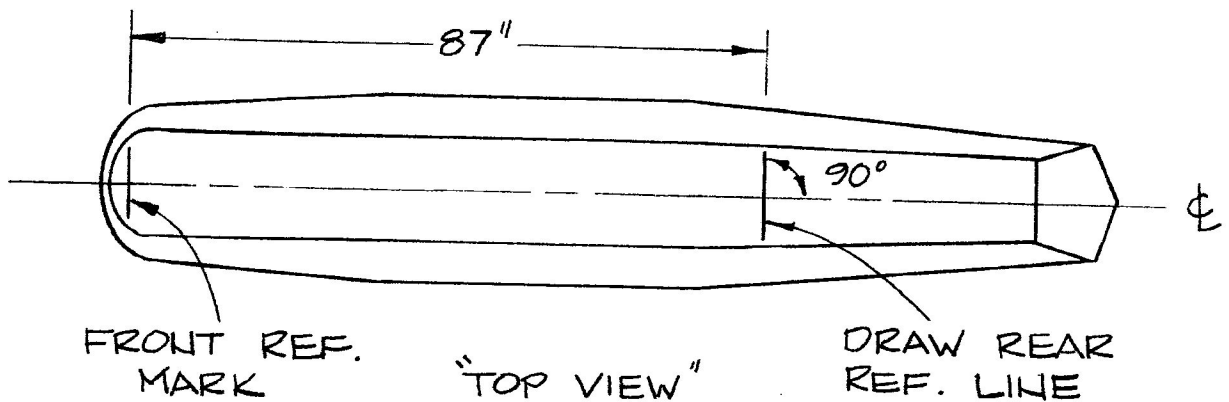
NOTE: TAPE IS SLIGHTLY OFFCENTER. EDGE USED TO INDICATE PONTOON  $\phi$

STEP #12

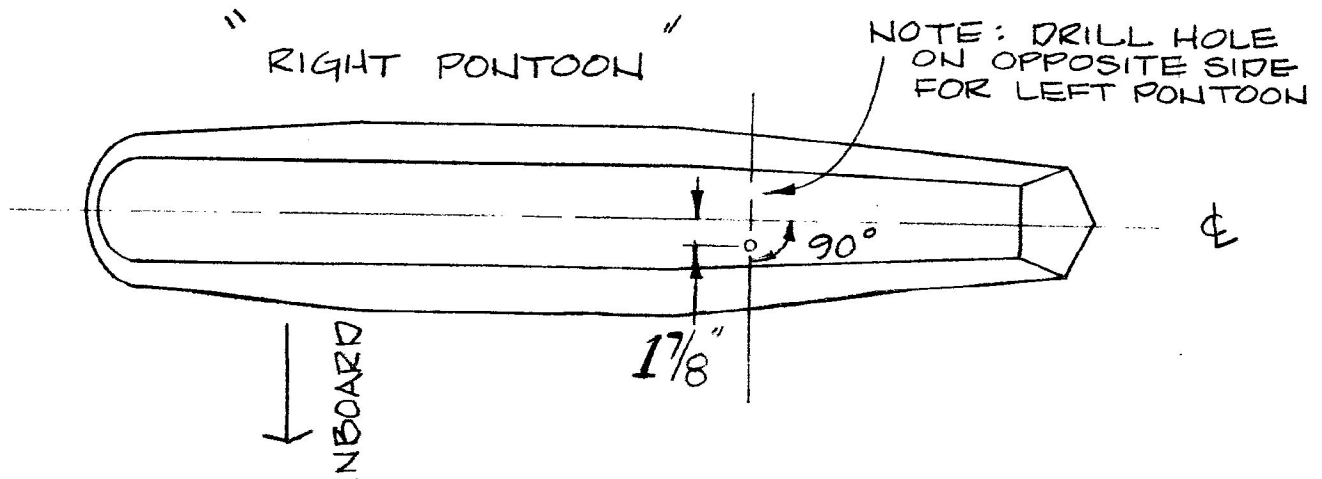
LAY A STRAIGHT EDGE FLAT AGAINST THE PONTOON BOW CENTERLINE AND MARK THE TANGENT POINT AS SHOWN.



MEASURE BACK ALONG THE PONTOON CENTERLINE AND DRAW A PERPENDICULAR LINE ACROSS THE TOP OF THE PONTOON, 87" FROM THE FRONT REFERENCE MARK.

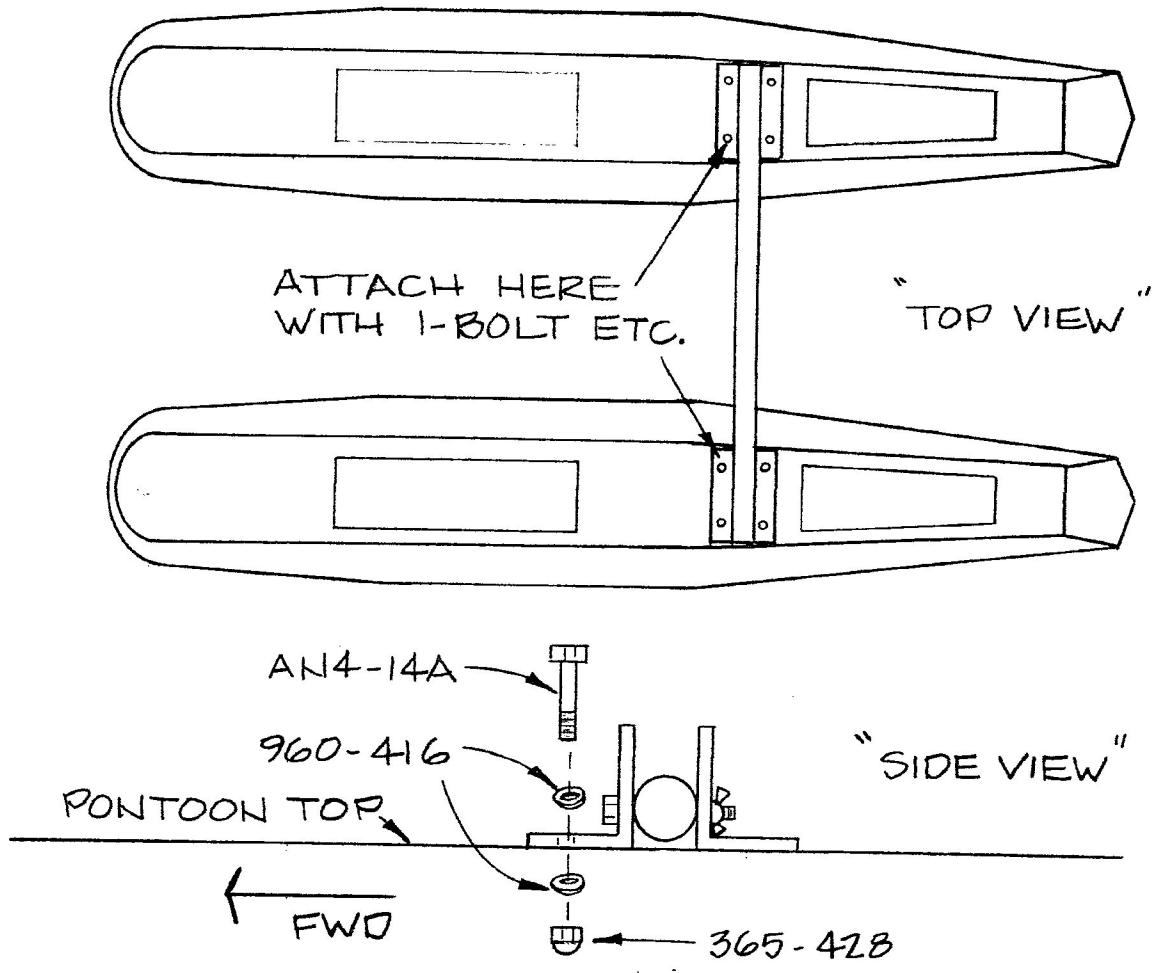


MEASURE INBOARD AND PLACE A MARK 1-7/8" FROM THE CENTERLINE. DRILL A 1/4" HOLE, FORMING A RIGHT OR LEFT PONTOON. HOLE WILL BE ON OPPOSITE SIDE OF CENTERLINE FOR OPPOSITE PONTOONS. USE A CENTER PUNCH TO MARK HOLE PRIOR TO DRILLING.



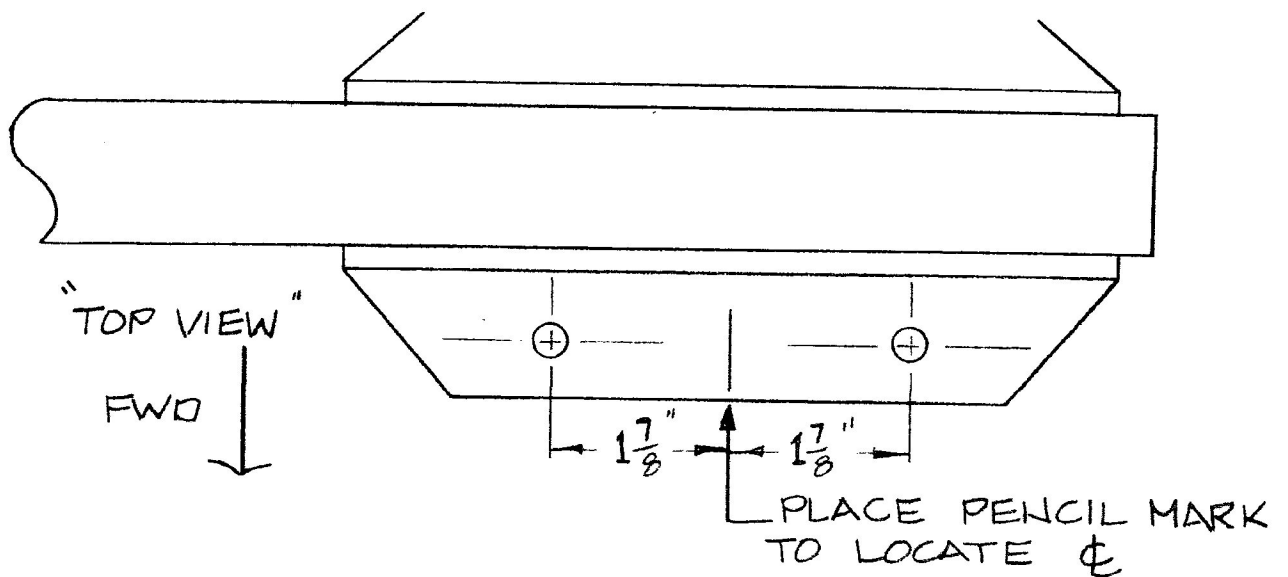
STEP #13

LAY REAR SPAR AND BRACKET ASSEMBLY ACROSS REAR OF PONTOONS AND TEMPORARILY ATTACH WITH ONE BOLT IN EACH PONTOON. TIGHTEN BOLTS BARELY SNUG TO ALLOW FOR ADJUSTMENT.



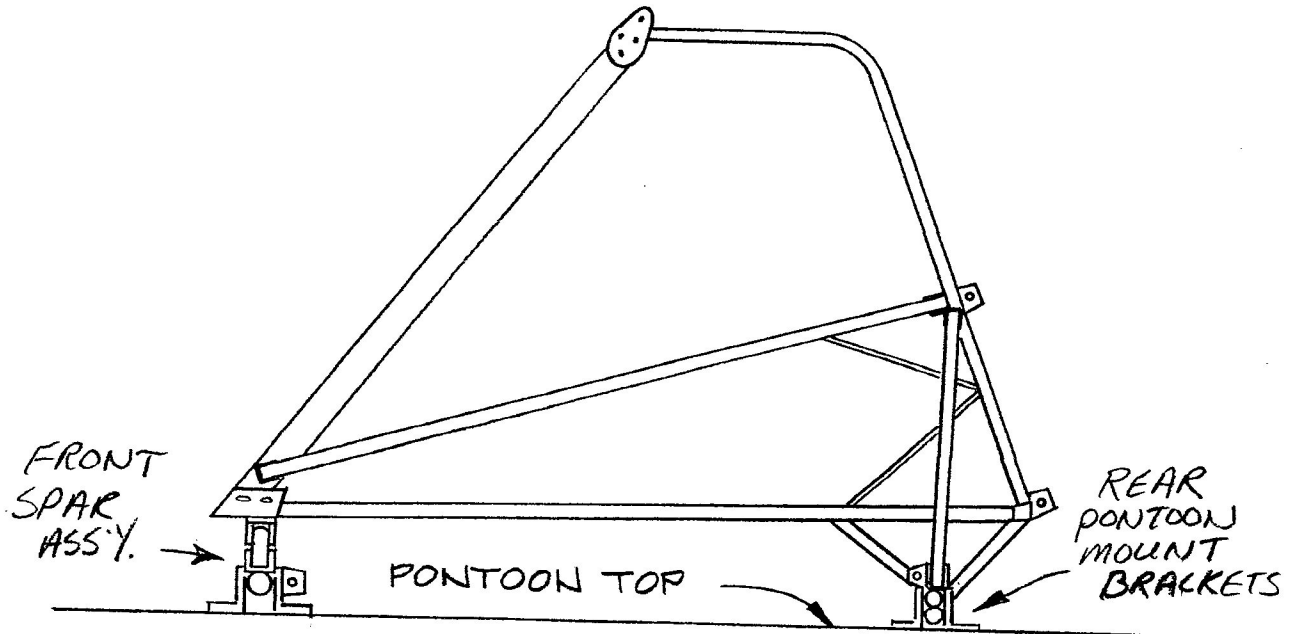
STEP #14

MEASURE AND MARK THE CENTERLINE ON THE FORWARD SIDE OF BOTH PONTOON FRONT ATTACH BRACKETS LOCATED ON FRONT SPAR ASSEMBLY AS SHOWN.



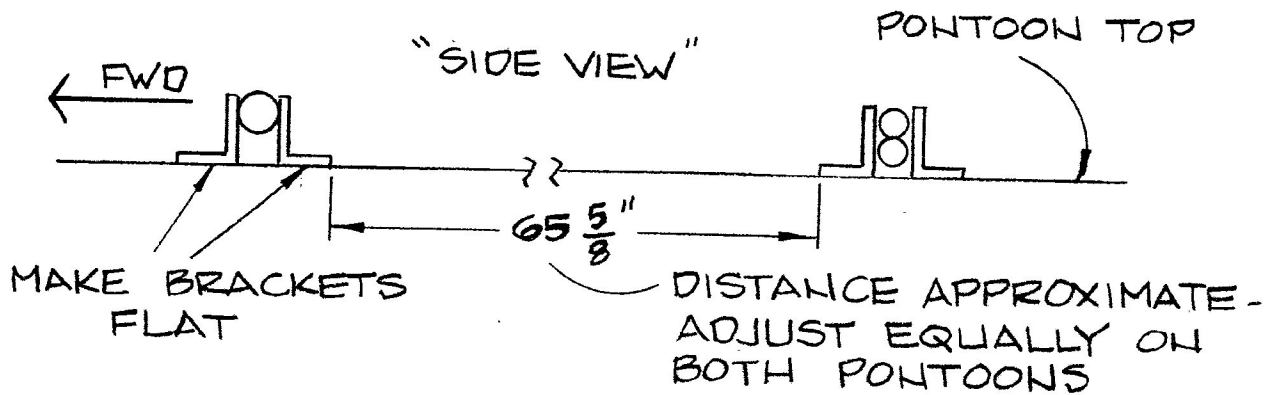
STEP #15

PLACE FRAME WITH FRONT SPAR ASSEMBLY IN POSITION IN REAR PONTOON MOUNT BRACKETS. BE SURE REAR AXLE STRUT ENDS ARE POSITIONED EQUALLY OVER REAR SPAR SO THAT FRAME IS EVENLY CENTERED ABOVE PONTOONS.



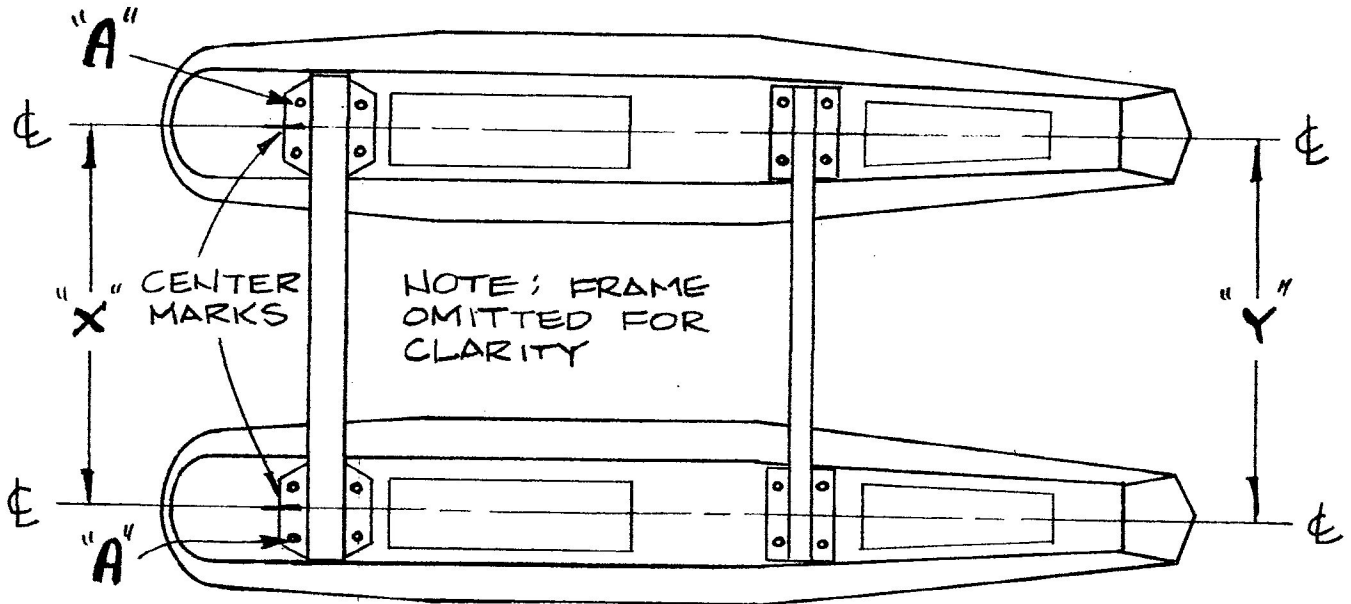
STEP #16

ALIGN CENTER MARK ON FRONT MOUNT BRACKETS WITH CENTERLINE LAID OUT ON PONTOON. MEASURE AND ADJUST DISTANCE BETWEEN FRONT AND REAR PONTOON SPARS UNTIL DISTANCE BETWEEN BRACKETS ON BOTH PONTOONS IS EQUAL. MAKE SURE FRONT MOUNT BRACKETS ARE SITTING FLAT IN POSITION ON TOP PONTOON.



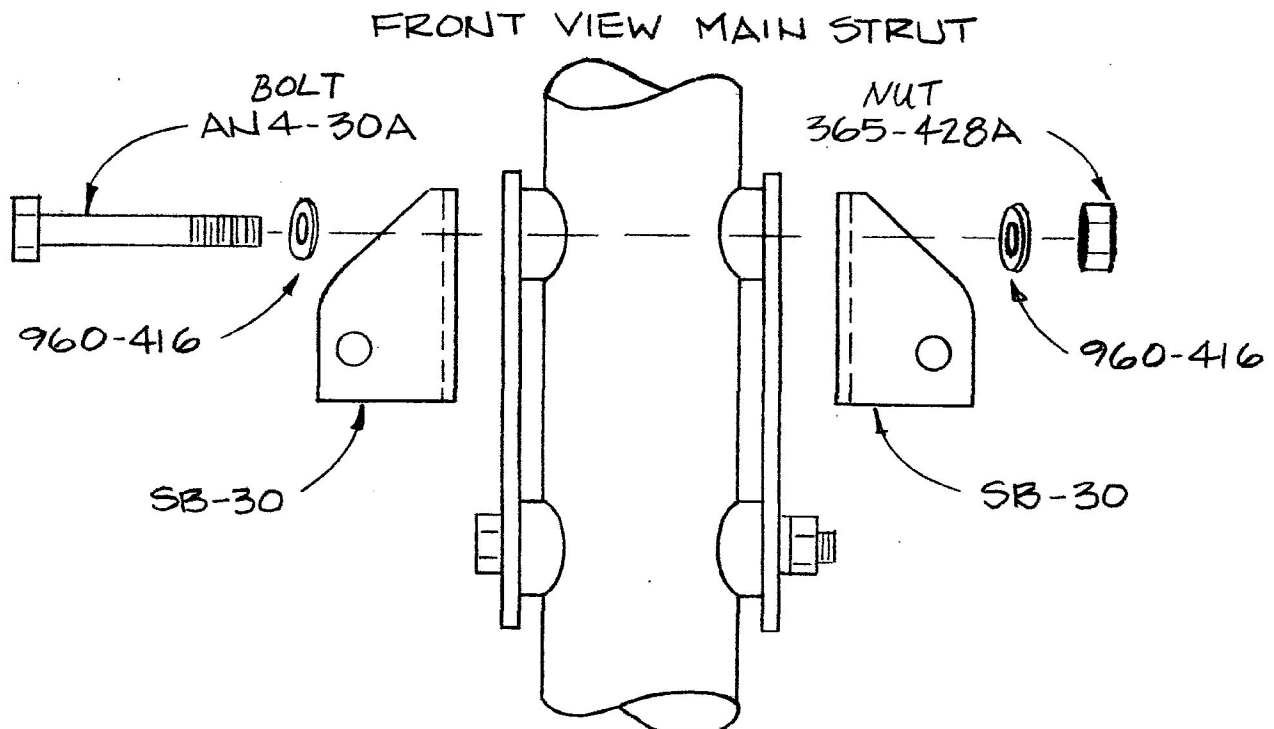
### STEP #17

MEASURE THE DISTANCES X, Y BETWEEN THE CENTERLINES AT THE FRONT AND REAR OF EACH PONTOON. DOUBLE CHECK TO BE SURE THE CENTER MARKS ON FRONT MOUNT BRACKETS ARE ALIGNED WITH PONTOON CENTERLINES, DISTANCES BETWEEN SPARS ARE EQUAL ON BOTH PONTOONS AND BRACKETS ARE POSITIONED AS FLAT AS POSSIBLE. DISTANCE "Y" AT REAR OF PONTOON SHOULD BE APPROXIMATELY 1/2" TO 3/4" GREATER THAN DISTANCE "X" AT FRONT, INDICATING PROPER TOW-IN. WHEN SATISFIED THAT PONTOONS ARE PROPERLY ALIGNED, CLAMP OR HOLD MOUNT BRACKETS SECURELY IN POSITION. DRILL 1/4" HOLES THROUGH MOUNT BRACKETS AT POSITION "A" AS INDICATED AND SECURE TO PONTOONS WITH AN4-14A BOLTS AND PROPER NUTS AND WASHERS AS IN STEP #13. DRILL DOWNWARD THROUGH ALL REMAINING MOUNT BRACKET HOLES AND BOLT ALL BRACKETS SECURELY TO PONTOONS WITH AN4-14A BOLTS, ETC. TIGHTEN SECURELY!



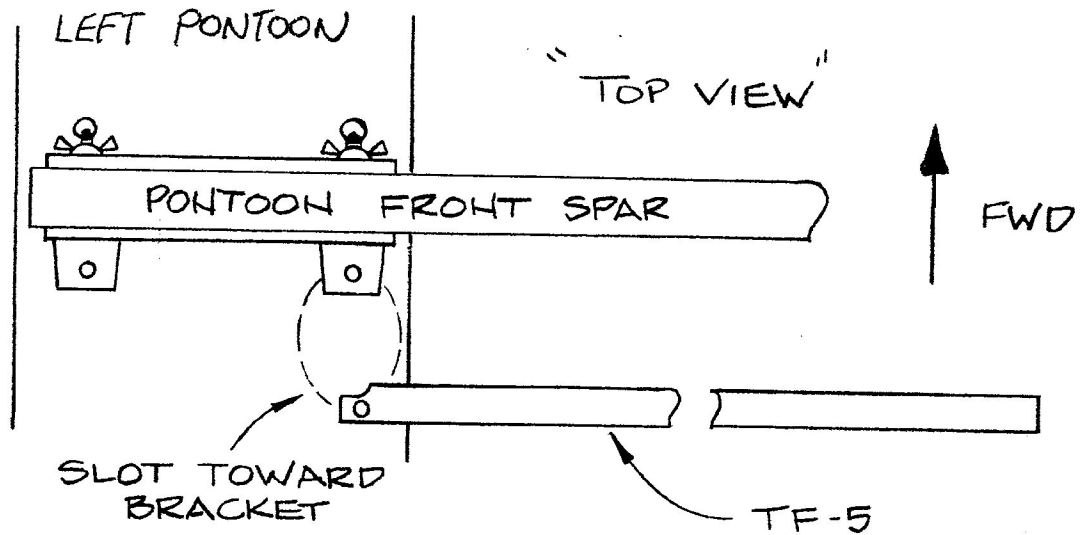
### STEP #18

REMOVE UPPER BOLT SECURING CONTROL ASSEMBLY MOUNT PLATES TO MAINSTRUT AND INSTALL NEW AN4-30A BOLT AND BRACKETS AS SHOWN. TIGHTEN BOLT SECURELY BUT LEAVE LOOSE ENOUGH TO ALLOW BRACKETS TO ROTATE A LITTLE FOR ALIGNMENT.



STEP #19

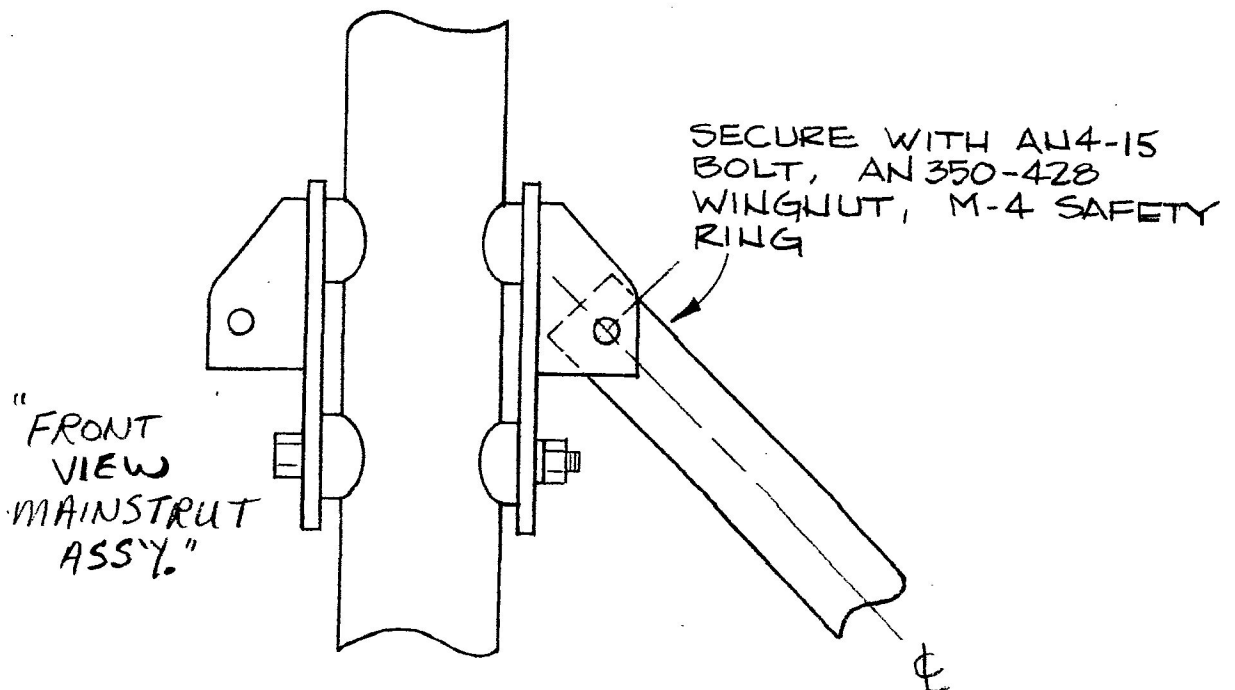
ATTACH SLOTTED END OF FRONT DIAGONAL STRUT, #TF-5, TO #S-29 BRACKET ON BACK OF FRONT SPAR AS SHOWN.



TEMPORARILY SECURE TO BRACKET WITH AN4-16A, TWO 960-416 WASHERS AND ONE NUT, AN365-428A. TIGHTEN NUT ONLY FINGER TIGHT FOR NOW.

STEP #20

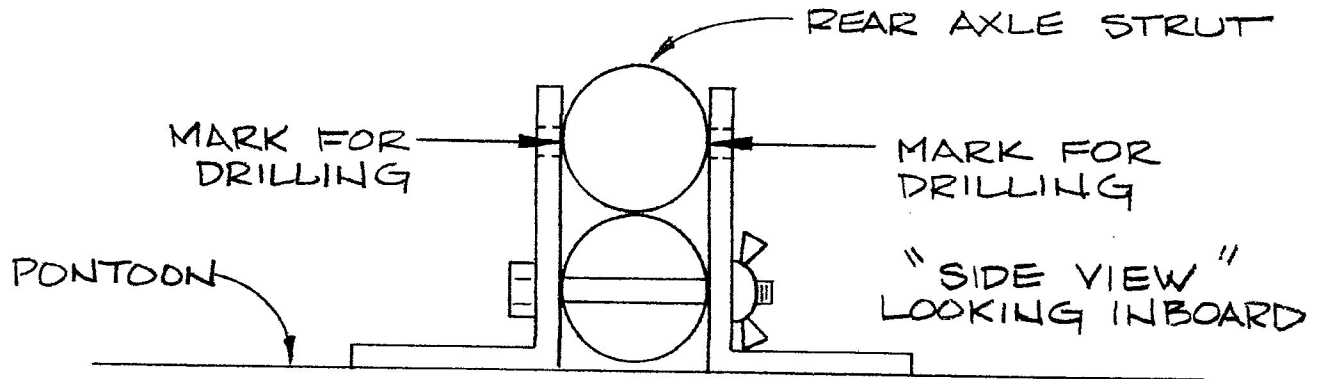
PLACE A PENCIL MARK  $1/2$ " FROM END ON BOTH SIDES OF DIAGONAL STRUT END. ALIGN STRUT END WITH BRACKET AND POSITION AS SHOWN. PLACE CENTERLINE OF TUBE AND  $1/2$ " PENCIL MARK DIRECTLY "CENTERED" BENEATH HOLE IN BRACKET AND MARK BOTH SIDES OF TUBE END FOR DRILLING. REMOVE AND CENTER PUNCH TUBE END. DRILL  $1/8$ " PILOT HOLES THROUGH EACH SIDE OF TUBE. FINALLY DRILL OUT HOLES TO  $1/4$ " DIAMETER AND REMOVE BURRS. REINSTALL TUBE ON FRAME AND TIGHTEN BOLT IN TUBE LOWER END SECURELY! TIGHTEN UPPER END WINGNUT FINGER TIGHT. REPEAT PROCESS ON OTHER SIDE.



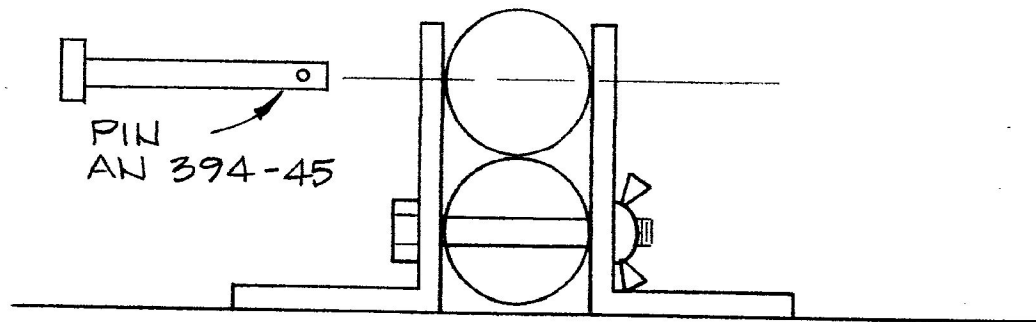


## STEP #21

DOUBLE CHECK TO BE SURE PONTOON REAR AXLE STRUTS ARE EVENLY CENTERED ABOVE PONTOON REAR SPAR, I.E., ONE STRUT END IS NOT STICKING OUT OF BRACKETS FARTHER THAN THE OTHER. CAREFULLY MARK EACH SIDE OF REAR AXLE STRUTS FOR DRILLING OF TWO HOLES IN EACH STRUT OUTER END, CORRESPONDING TO HOLES IN REAR MOUNT BRACKETS.



PROP UP REAR OF UNDERCARRIAGE ASSEMBLY AND REMOVE REAR AXLE STRUTS. CENTERPUNCH HOLE LOCATIONS IN STRUT ENDS AND DRILL THROUGH FROM BOTH SIDES WITH A 1/8" DIAMETER PILOT DRILL. DRILL ALL HOLES OUT TO A FINAL SIZE OF 9/32" AND DEBURR HOLES. REINSTALL STRUTS ON UNDERCARRIAGE AND LOWER AXLE STRUTS INTO BRACKETS AS SHOWN. INSERT TEMPORARY PINS THROUGH BRACKETS AND STRUTS TO CHECK FOR PROPER FIT.



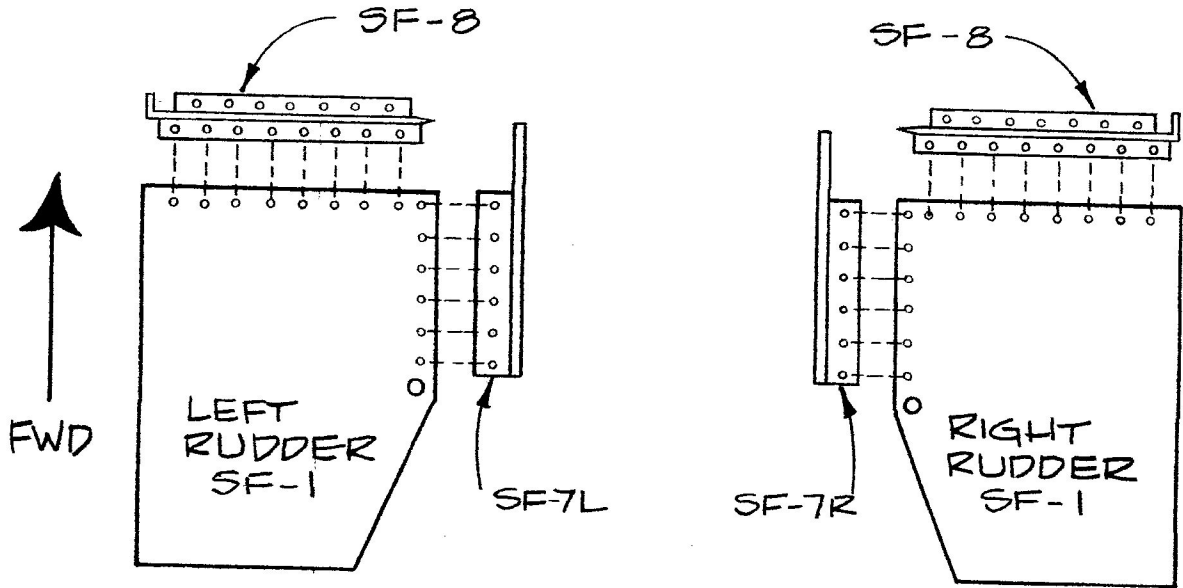
## STEP #22

AFTER MOUNTING AND DRILLING FRONT DIAGONAL AND PONTOON AXLE STRUTS, REMOVE FRAME AND PONTOON SPARS FROM PONTOON ASSEMBLY BY REMOVING PARTS IN THE FOLLOWING ORDER:

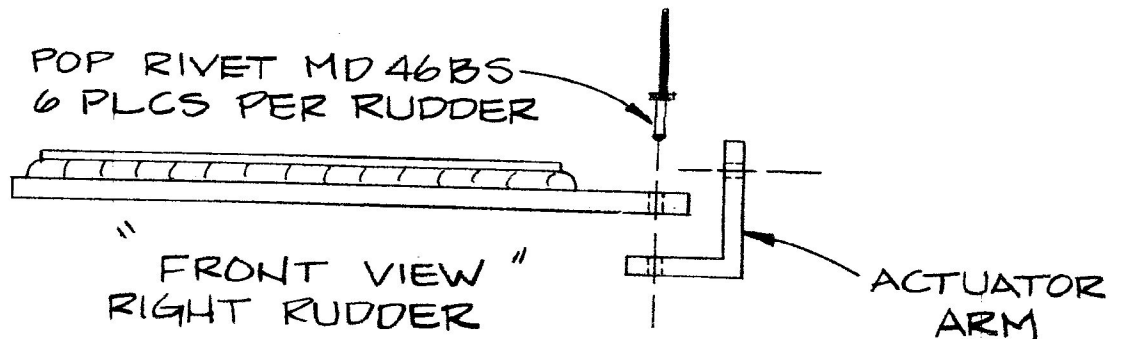
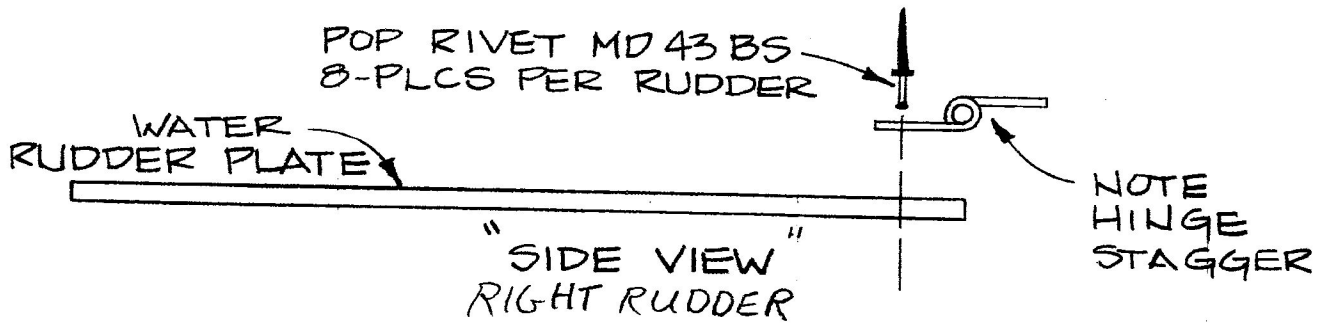
- A. REMOVE TEMPORARY PINS FROM AXLE STRUTS.
- B. DISCONNECT AND REMOVE FRONT DIAGONAL STRUTS BY REMOVING FOUR FRONT SPAR BOLTS AND TWO UPPER DIAGONAL STRUT END BOLTS SECURED BY WINGNUTS.
- C. REMOVE CLEVIS PIN FROM BRACKET BENEATH FLYING WIRE PLATE.
- D. LIFT FRAME FROM PONTOON ASSEMBLY.
- E. REMOVE PONTOON FRONT SPAR FROM BRACKETS.
- F. REMOVE TEMPORARY BOLTS WITH WINGNUTS FROM REAR PONTOON BRACKETS AND LIFT OUT REAR SPAR.
- G. LEAVE ALL ANGLE BRACKETS PERMANENTLY ATTACHED TO PONTOONS.

STEP #23

ASSEMBLE WATER RUDDERS, MOUNT HINGES AND ACTUATOR ARMS TO WATER RUDDER PLATES WITH PROPER RIVETS AS SHOWN.

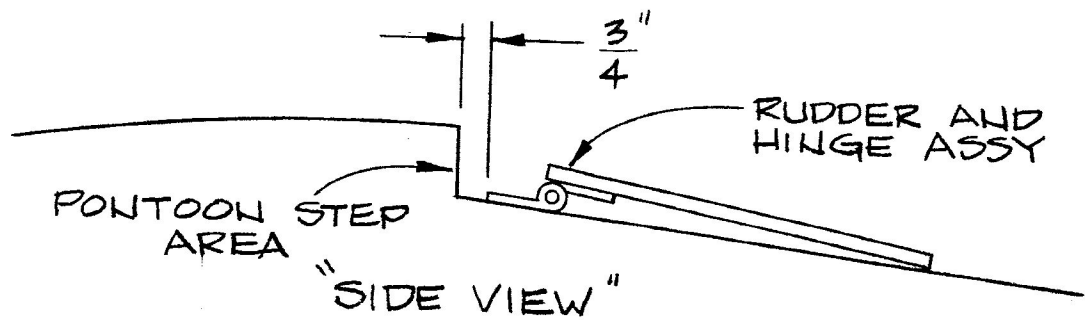


HINGES AND RUDDER ACTUATOR ARMS MOUNT TO TOP AND BOTTOM OF RUDDER PLATES. BE SURE TO USE PROPER LENGTH POP RIVETS WHEN ASSEMBLING.

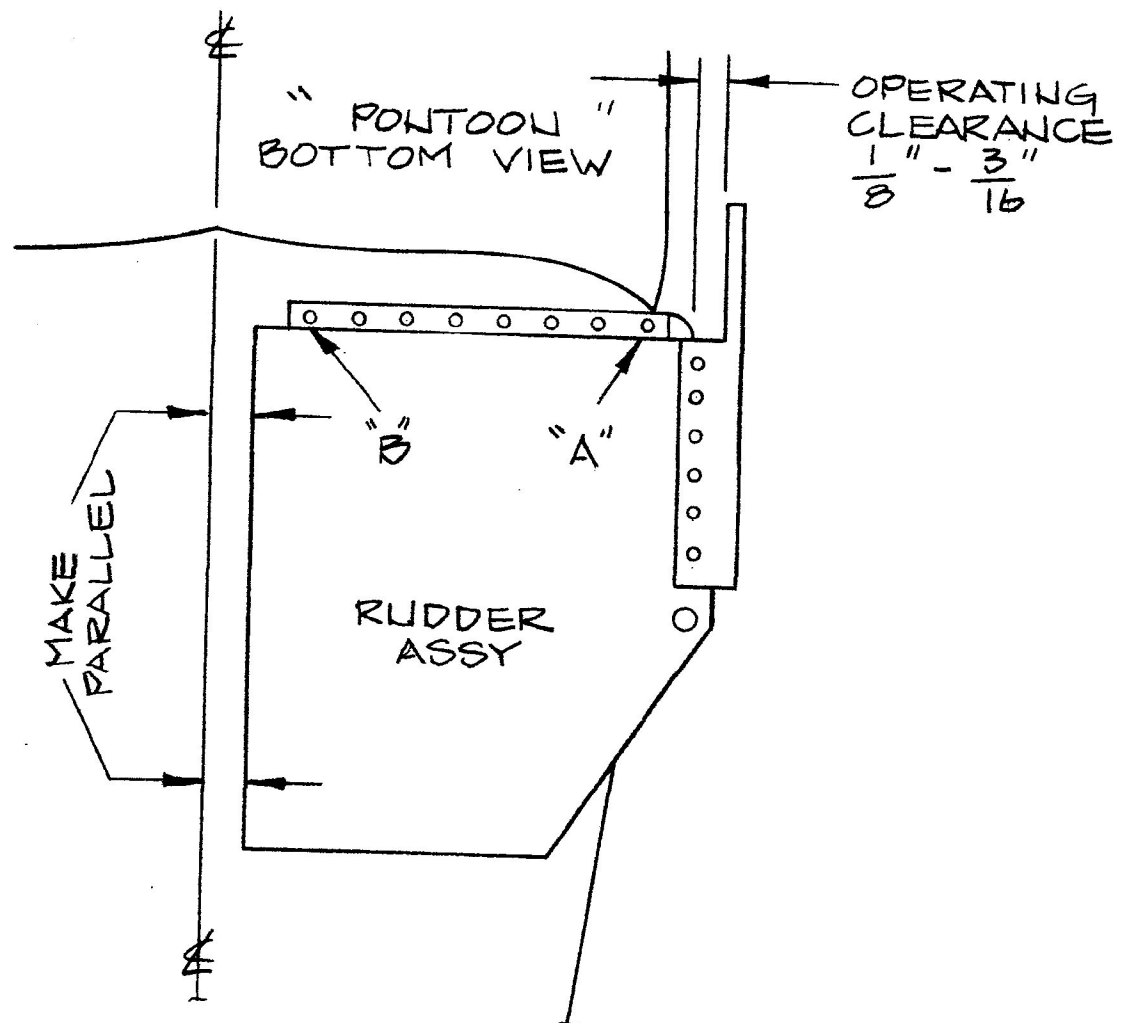


STEP #24

TURN PONTOON UPSIDE DOWN AND POSITION RUDDER ASSEMBLY FOR MOUNTING AS SHOWN.



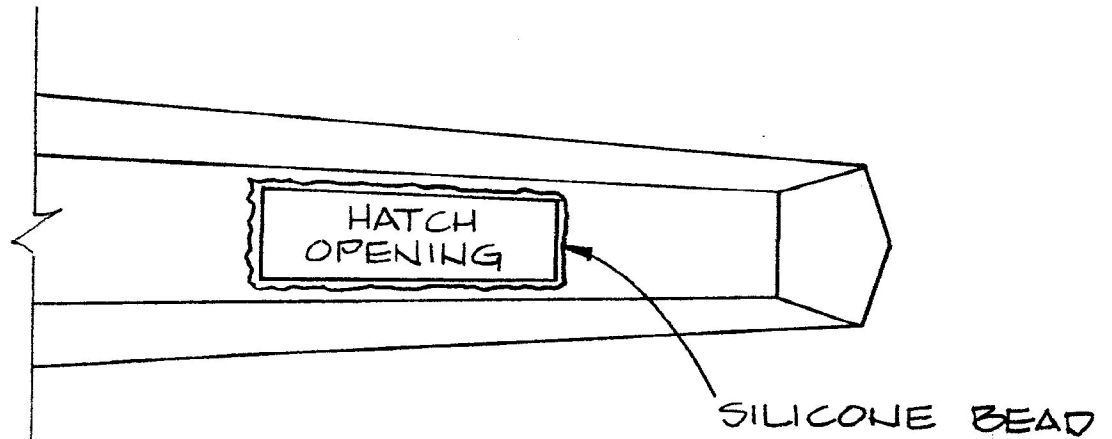
ALIGN INBOARD EDGE OF RUDDER PARALLEL TO PONTOON CENTERLINE. LEAVE PROPER GAP BETWEEN OUTSIDE EDGE OF PONTOON AND ACTUATOR ARM.



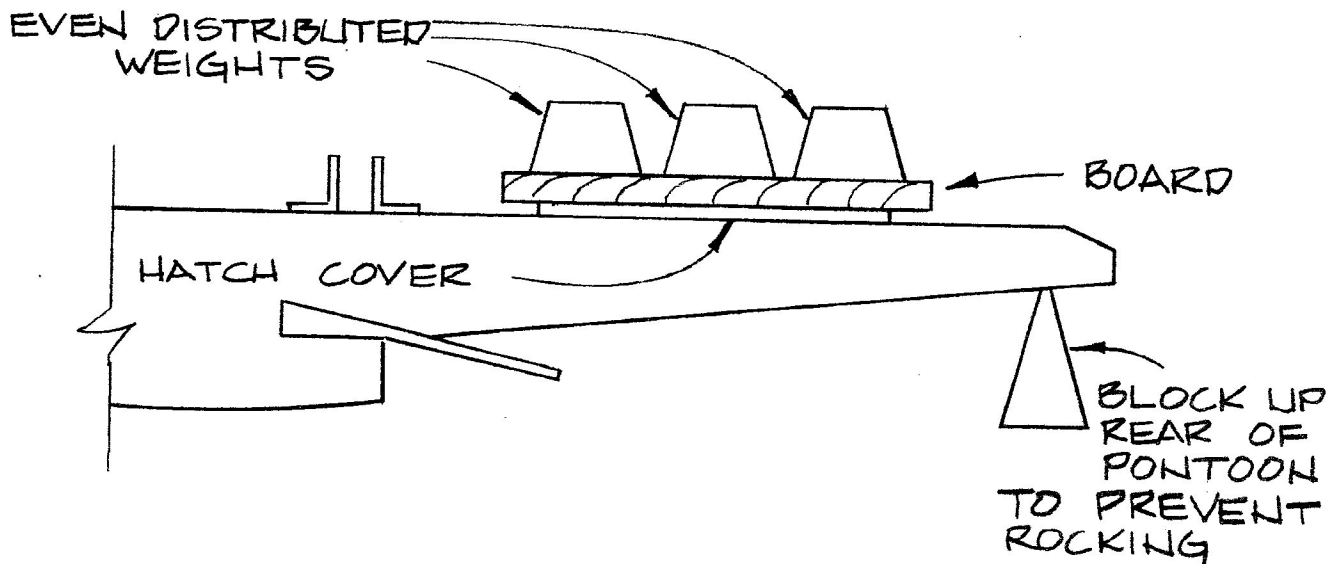
CLAMP OR HOLD RUDDER ASSEMBLY IN POSITION FOR DRILLING. USING HINGE AS A TEMPLATE, DRILL  $\frac{1}{8}$ " HOLES THROUGH HINGE INTO PONTOON AT POSITIONS A AND B AS SHOWN. TEMPORARILY INSERT POP RIVETS INTO HOLES A, B TO HELP HOLD HINGE IN PROPER POSITION WHILE YOU FINISH DRILLING THE REMAINING RIVET HOLES. AFTER YOU HAVE SUCCESSFULLY LOCATED ALL RIVET HOLES, REMOVE RIVETS AND RUDDER ASSEMBLY. REMOVE ANY BURRS WITH FILE. APPLY A SMALL BEAD OF CLEAR SILICONE SEALANT SUPPLIED IN KIT TO EACH RIVET HOLE IN PONTOON. PLACE RUDDER AND HINGE ASSEMBLY IN POSITION AND INSTALL PERMANENTLY WITH RIVET MD43BS. APPLY A SECOND BEAD OF SILICONE SEALANT TO THE TOP OF EACH RIVET HEAD, COMPLETELY COVERING IT TO PREVENT WATER FROM LEAKING THROUGH CENTER OF RIVET INTO PONTOON.

STEP #25

RETURN PONTOON TO THE RIGHT SIDE UP POSITION. DOUBLE CHECK TO BE SURE ALL BOLTS SECURING MOUNT BRACKETS TO PONTOONS HAVE BEEN SECURELY TIGHTENED. SAND THE MATING SURFACES OF THE PONTOON AND REAR HATCH COVERS THOROUGHLY WITH LIGHT WEIGHT 60-100 GRIT SANDPAPER IN ORDER TO PREPARE THEM FOR BONDING. AFTER SANDING, USE PAINT THINNER OR ACETONE AND A CLEAN RAG TO REMOVE ANY SANDING RESIDUE. RUN A THICK BEAD OF CLEAR SILICONE SEALANT ALL AROUND MATING SURFACES OF REAR HATCH COVER OPENING AS SHOWN.

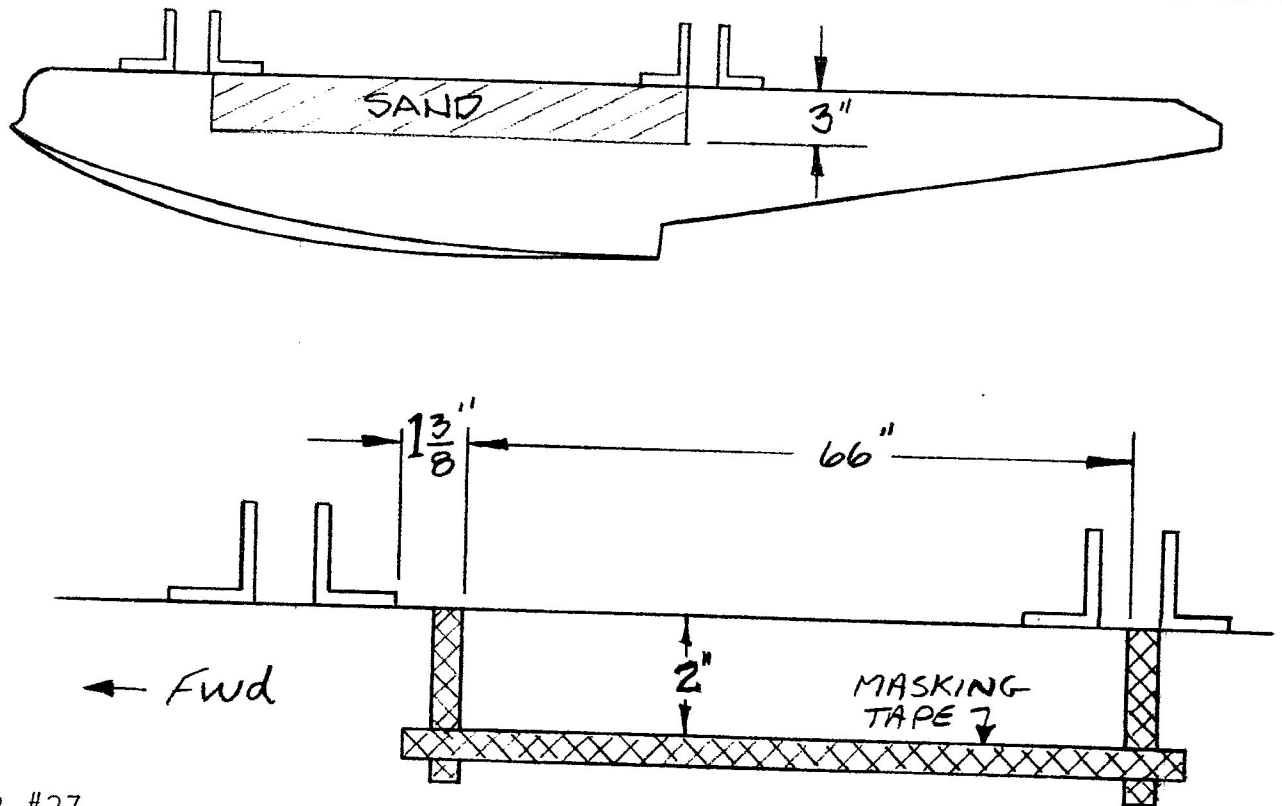


IN ONE SMOOTH ACTION, LAY REAR HATCH COVER IN POSITION AND PRESS GENTLY DOWNWARD UNTIL YOU CAN SEE SILICONE SEEPING OUT ALL AROUND THE EDGES. LAY A BOARD WITH WEIGHTS OR OTHER FLAT, HEAVY OBJECT ON TOP AND ALLOW TO CURE AT ROOM TEMPERATURE FOR 24 HOURS.



### STEP #26

SAND AREA ON OUTSIDE OF PONTOON WITH LIGHT SANDPAPER IN ORDER TO PREPARE IT FOR APPLICATION OF VELCRO ADHESIVE. MASK OFF AREA AS INDICATED AFTER SANDING.

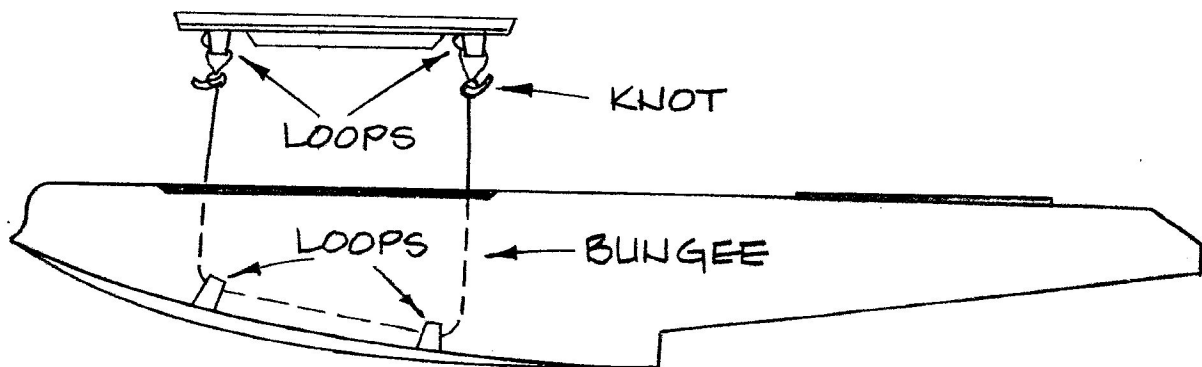


### STEP #27

REMOVE 66" LONG HOOK PORTION OF VELCRO FROM SPRAY DECK BY PEELING THE TWO PIECES APART. PLACE PONTOONS IN A ROOM WHERE THE TEMPERATURE IS AT LEAST 65° OR GREATER. USE A CHEAP 1" WIDE THROW-AWAY BRUSH TO APPLY A SINGLE HEAVY COAT OF 3M #1357 CONTACT CEMENT (SUPPLIED IN KIT) TO MASKED OFF AREA OF PONTOON AND BACK OF VELCRO STRIP. AS SOON AS THE VELCRO STRIP HAS BEGUN TO GET TACKY, APPLY A SECOND COATING OVER THE FIRST. ALLOW 5 OR 10 MINUTES FOR THE CONTACT CEMENT TO DRY, THEN CAREFULLY PRESS VELCRO INTO POSITION ON PONTOON. REMOVE MASKING TAPE. USE A BLUNT OBJECT, SUCH AS THE BOTTOM OF A SPOON, TO FIRMLY PRESS THE VELCRO IN PLACE AGAINST PONTOON, SEALING IT DOWN, PARTICULARLY AROUND THE ENDS AND LOWER EDGES. REPEAT THE PROCESS WITH THE OTHER PONTOON.

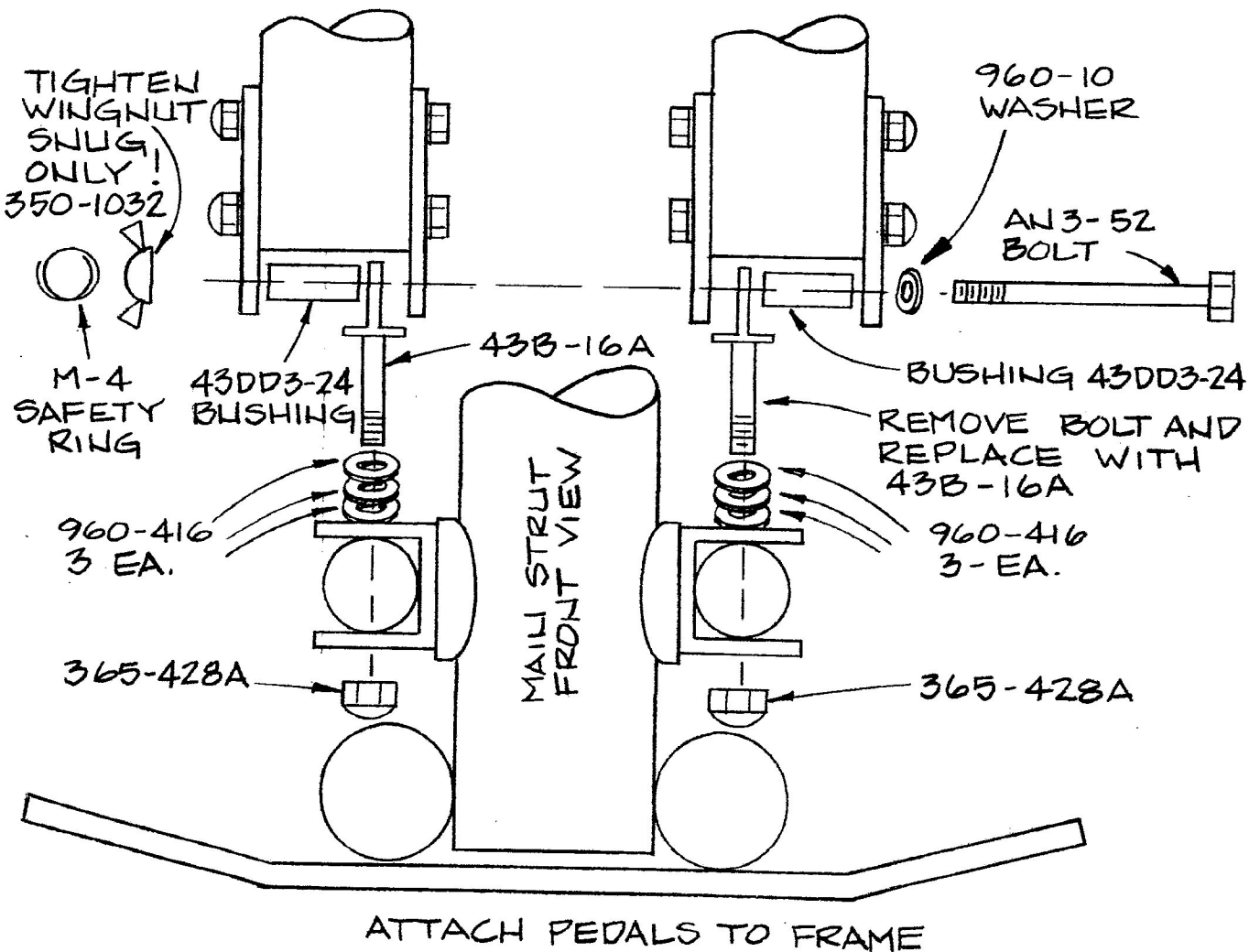
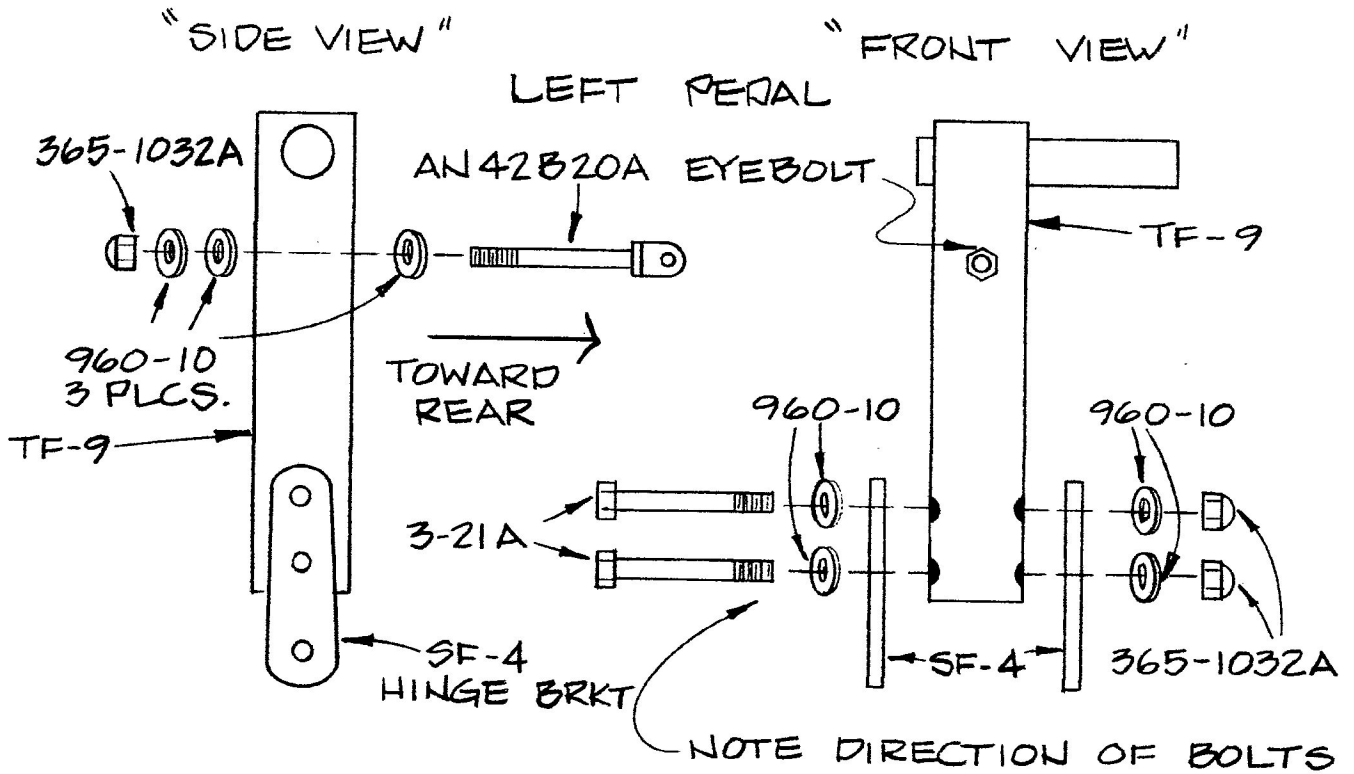
### STEP #28

CUT AND HEAT SEAL THE ENDS OF A 3/16" BUNGEE CORD, 36" LONG. TIE ONE END THROUGH ONE OF THE FIBERGLASS LOOPS LOCATED ON THE BOTTOM OF THE FRONT HATCH COVERS. PASS THE OTHER END OF THE BUNGEE DOWN INTO THE PONTOON, THROUGH THE TWO LOOPS IN THE PONTOON BOTTOM AND BACK AGAIN TO THE REMAINING HATCH COVER LOOP. BE SURE THE KNOTS SECURING THE ENDS OF THE BUNGEE TO THE HATCH COVER LOOPS ARE TIED SECURELY.



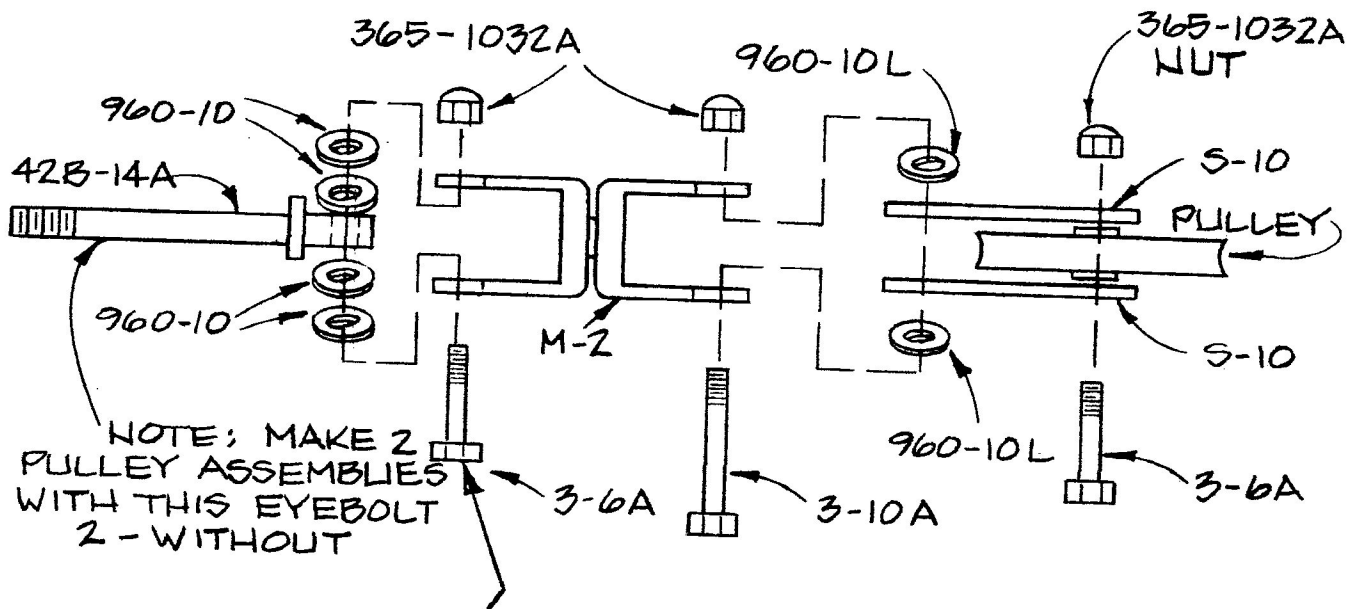
STEP #29

ASSEMBLE ONE LEFT AND ONE RIGHT WATER RUDDER PEDAL AS SHOWN. REMOVE 1/4" BOLTS FROM #S-29 BRACKETS JOINING SIDE FRAME TUBES TO BOTTOM OF MAINSTRUT AND REPLACE WITH 1/4" EYEBOLTS AN43B16A. ATTACH PEDALS TO FRAME AT EYEBOLTS WITH PROPER HARDWARE. TIGHTEN WINGNUT SNUG ONLY.



STEP #30

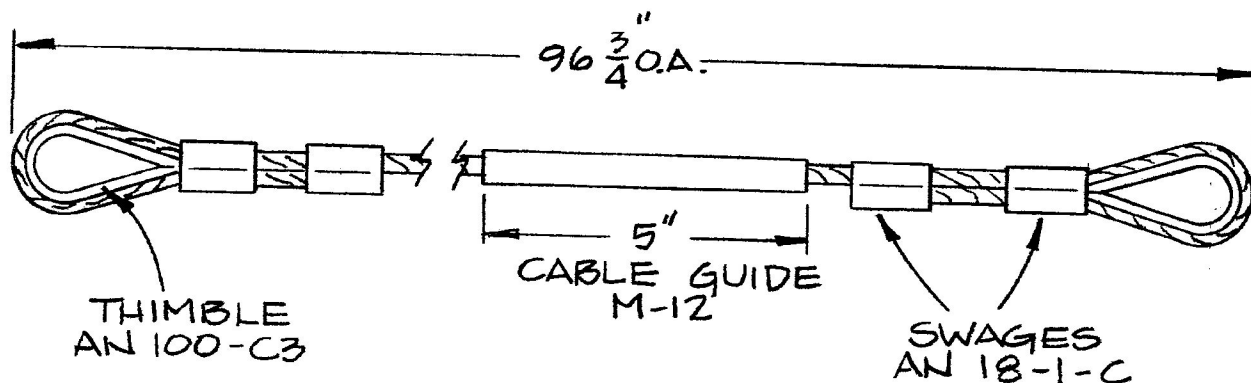
ASSEMBLE FOUR RUDDER CABLE PULLEYS AS SHOWN. REMOVE LOCK PINS FROM SWIVELS AND DRILL OUT HOLES TO 3/16" DIAMETER. WHEN PULLEYS ARE ASSEMBLED, TIGHTEN BOLTS AND NUTS SECURELY.



TIGHTEN THIS BOLT SECURELY BUT LEAVE LOOSE ENOUGH TO ALLOW SWIVEL END TO ROTATE ON HEAD OF EYEBOLT FOR LATER ALIGNMENT.

STEP #31

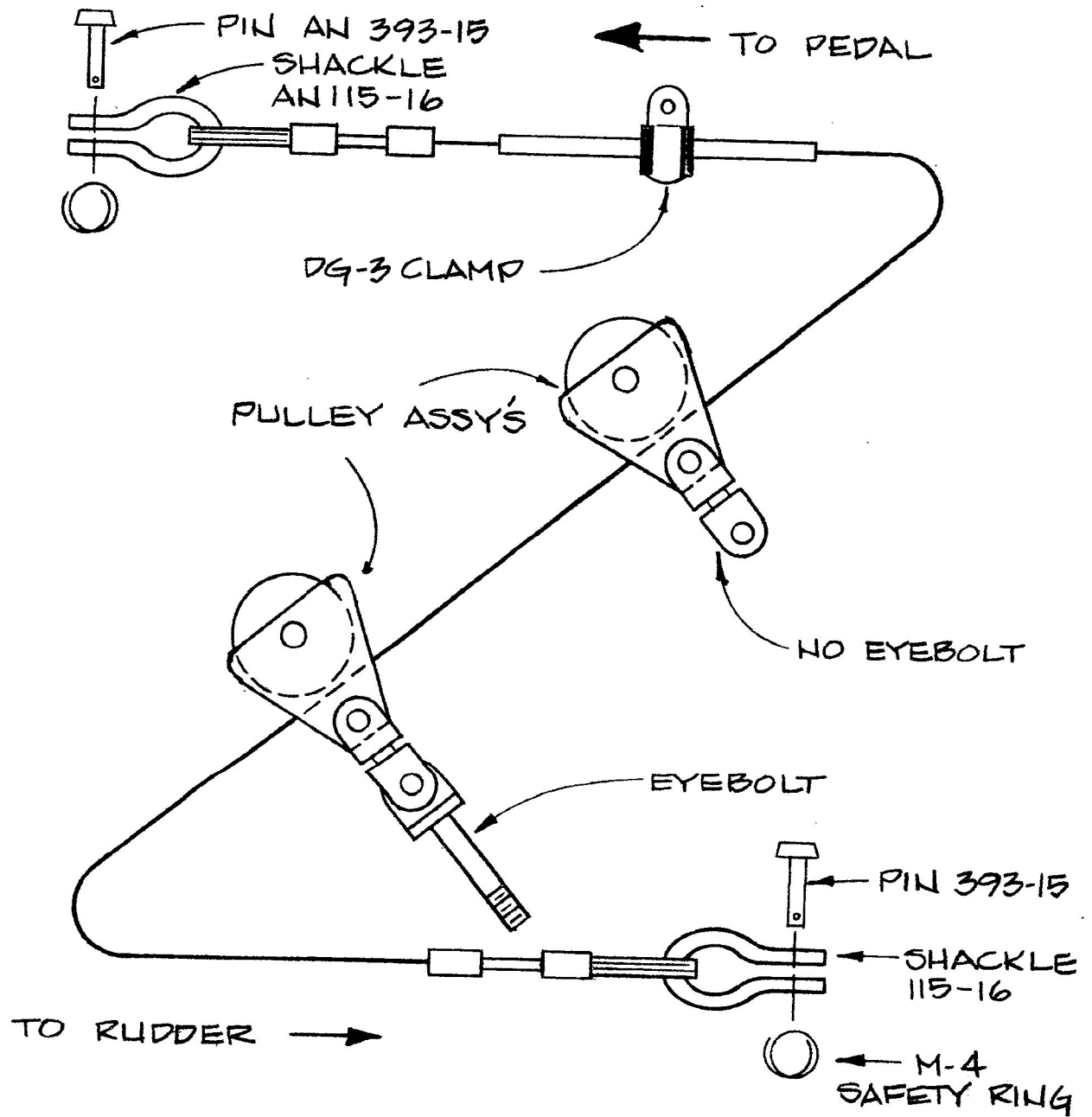
CUT TWO PIECES OF 1/16" CABLE, EACH ONE 108" LONG, FROM 18' PIECE SUPPLIED IN KIT AND MAKE TWO RUDDER CONTROL CABLES AS SHOWN. BE SURE TO USE PROPER SWAGING TOOL TO CRIMP SWAGES.



BE SURE TO CUT AND INSTALL 5" LONG CABLE GUIDE PRIOR TO SWAGING FINAL END OF CABLE.

STEP #32

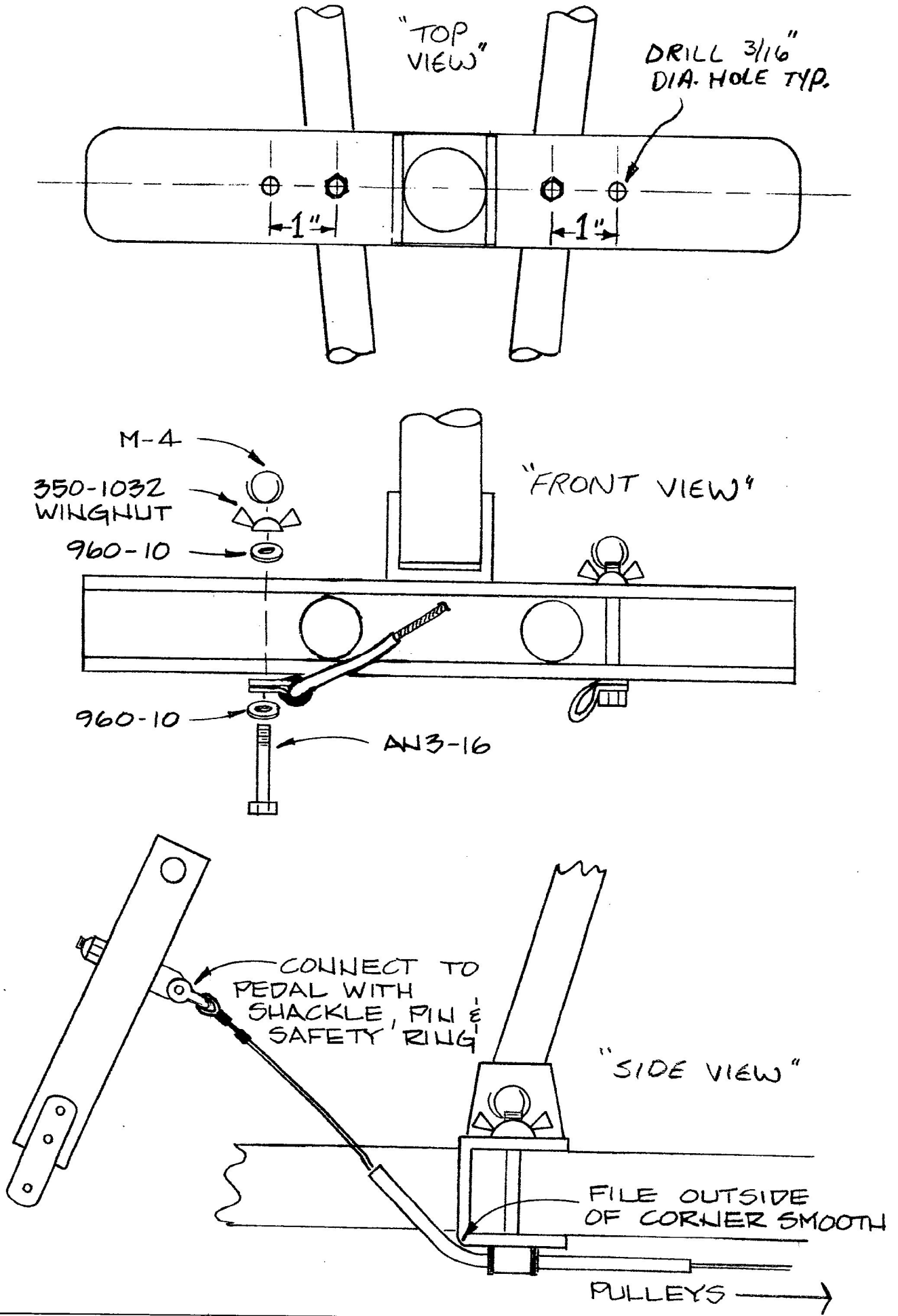
COMPLETE RUDDER CONTROL ASSEMBLIES BY INSTALLING HARDWARE ON CABLE AS SHOWN.





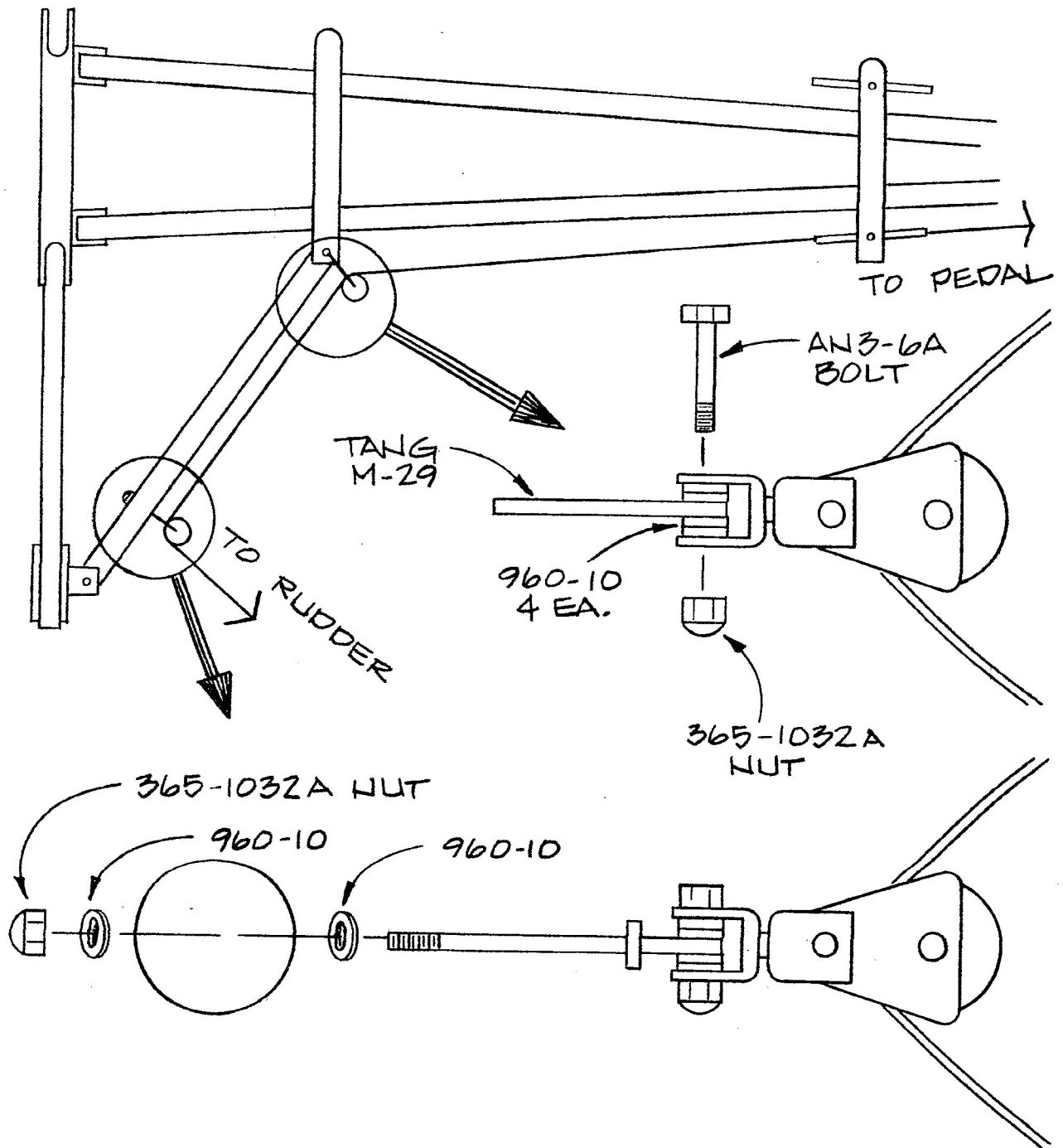
STEP #33

DRILL TWO 3/16" MOUNT HOLES IN FOOTREST BRACKET AS SHOWN. DEBURR HOLES AND CONNECT RUDDER CABLES TO FOOTREST BRACKET AND RUDDER PEDALS.



STEP #34

ATTACH RUDDER CONTROL PULLEYS TO FRAME STRUTS WITH HARDWARE AS SHOWN.



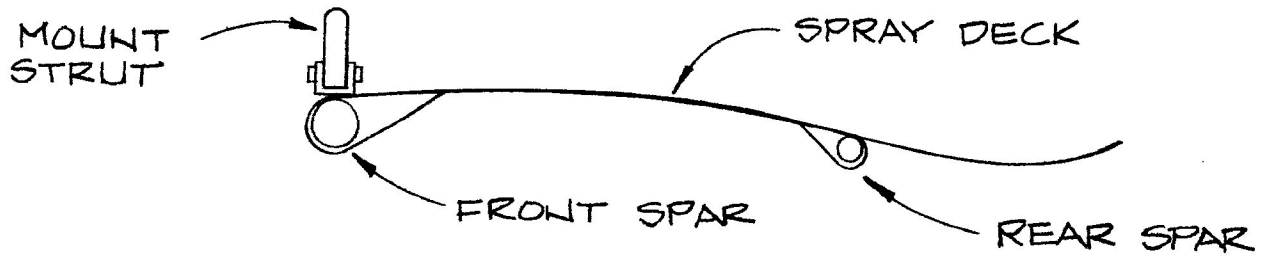
TIGHTEN ALL PIVOT BOLTS SECURELY BUT LEAVE LOOSE ENOUGH TO ROTATE A LITTLE FOR ALIGNMENT.

STEP #35

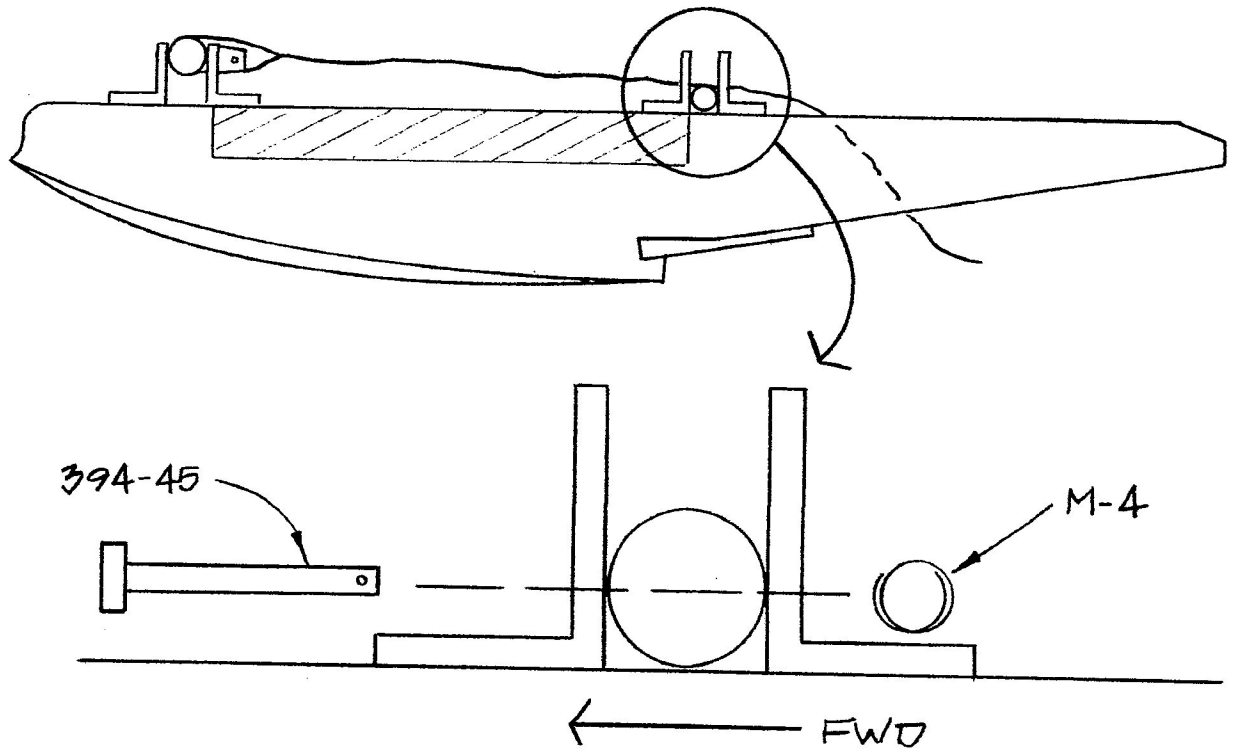
REMOUNT ENGINE ASSEMBLY ON BACK OF FRAME AND CONNECT ALL NECESSARY COMPONENTS. DOUBLE CHECK ALL FUEL, ELECTRICAL AND CONTROL LINES FOR PROPER SECURITY AND FUNCTION.

STEP #36

REMOVE FRONT SPAR MOUNT STRUT FROM PONTOON FRONT SPAR ASSEMBLY AND SLIDE FRONT AND REAR SPARS INTO POCKETS OF SPRAY DECK AS SHOWN. REATTACH MOUNT STRUT TO FRONT SPAR AND TIGHTEN SECURELY.

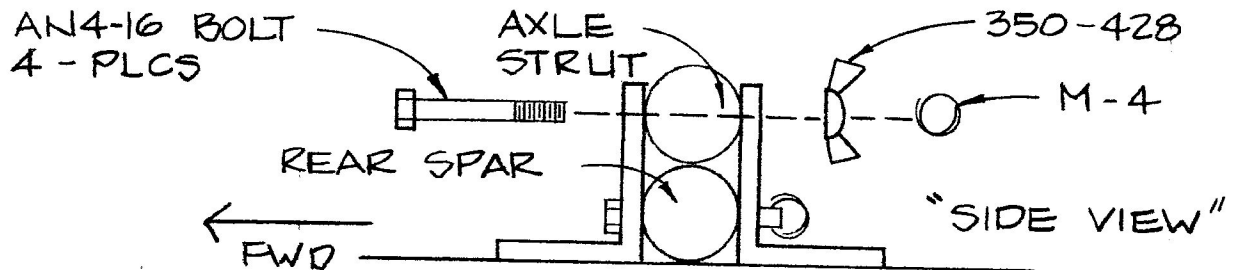


RECONNECT PONTOONS TOGETHER BY INSTALLING FRONT AND REAR SPARS IN PROPER POSITION. ATTACH REAR SPAR TO MOUNT BRACKETS WITH 4 CLEVIS PINS, AN394-45 AND #M-4 SAFETY RINGS INSTEAD OF BOLTS AND WINGNUTS USED IN STEP #10.



STEP #37

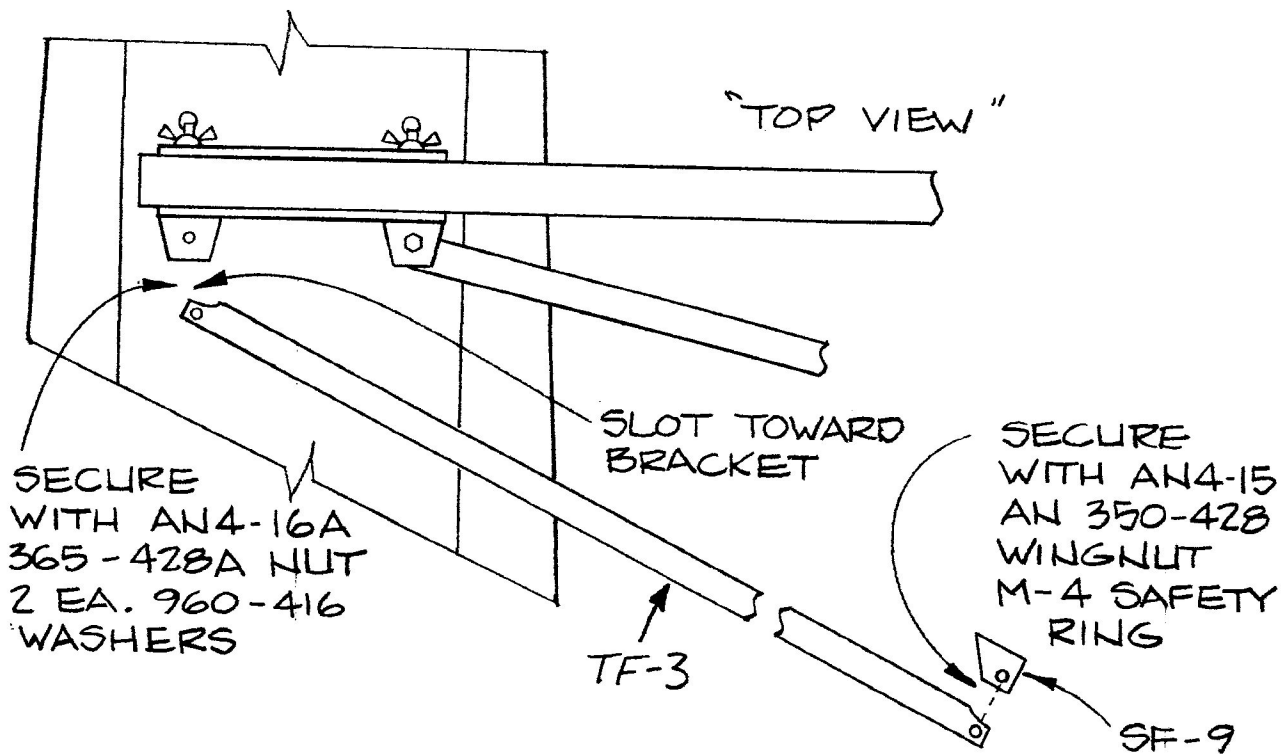
ASSEMBLE WING AND INSTALL ON TOP OF FRAME ASSEMBLY AS USUAL. WITH ASSISTANCE FROM A HELPER OR TWO, LIFT WING AND FRAME INTO POSITION ON TOP OF PONTOONS. CONNECT FRONT SPAR MOUNT STRUT WITH CLEVIS PIN AND SAFETY RING. ATTACH FRONT DIAGONAL STRUTS WITH PROPER BOLTS, WINGNUTS, ETC. AND SECURE AXLE STRUTS TO REAR MOUNT BRACKETS AS SHOWN.



THIS IS THE PROPER METHOD OF ATTACHING AXLE STRUTS TO BRACKETS AND CARE SHOULD BE TAKEN NOT TO CONFUSE AND IMPROPERLY INSTALL BOLT AND PIN ARRANGEMENT IN REAR MOUNT BRACKETS. TIGHTEN WINGNUTS SECURELY!

STEP #38

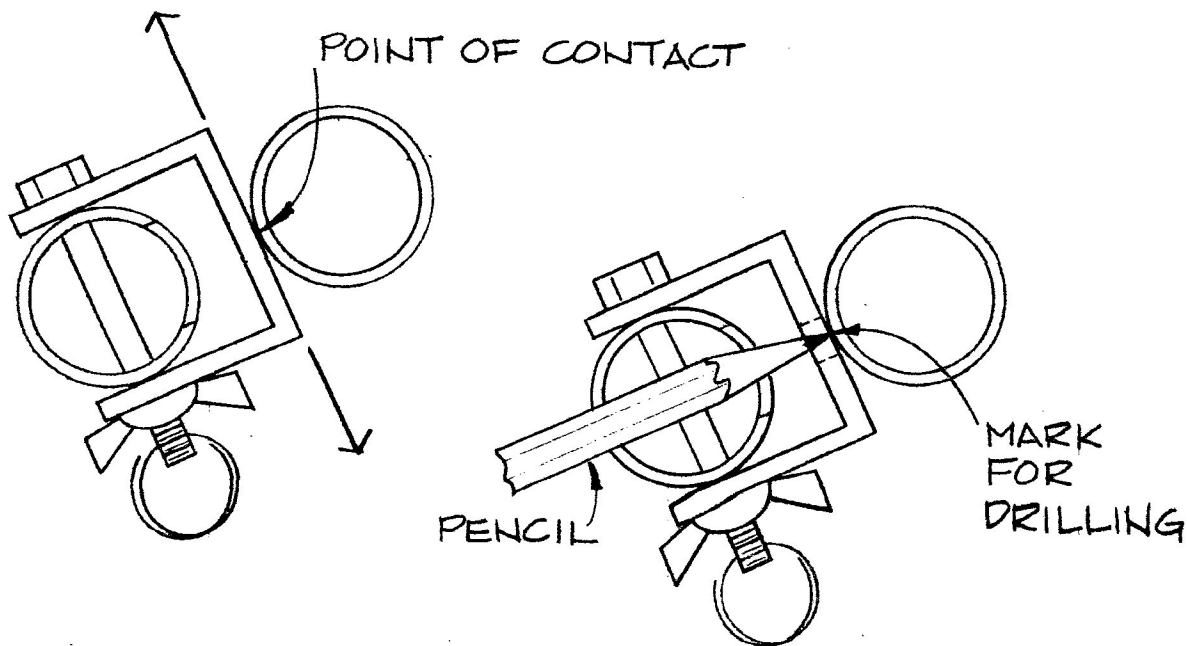
ATTACH MID-DIAGONAL STRUT, #TF-3, TO OUTER #S-29 MOUNT BRACKET ON REAR OF PONTOON FRONT SPAR AS SHOWN.



ATTACH MID-DIAGONAL REAR MOUNT BRACKET #SF-9 TO STRUT END (SLOT TOWARD BRACKET) AS SHOWN.

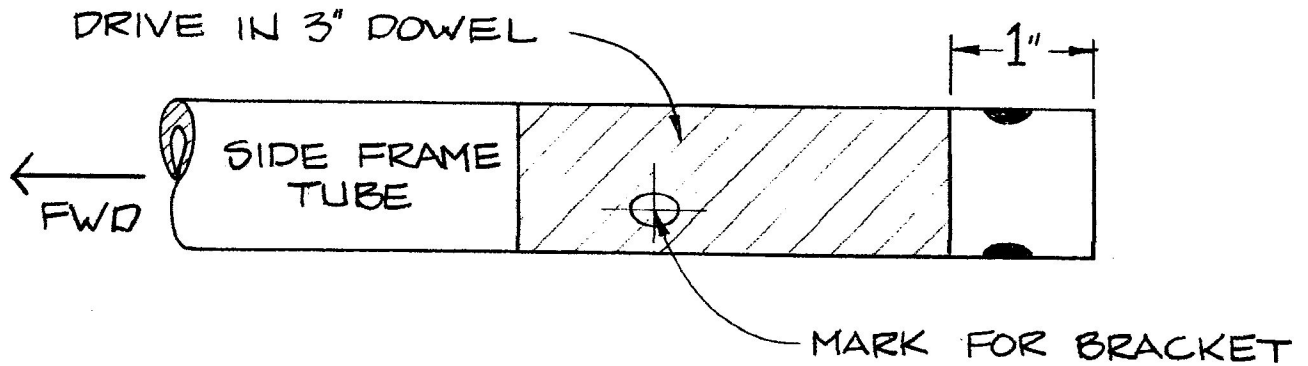
STEP #39

PUSH MID-DIAGONAL REAR MOUNT BRACKET FLAT AGAINST SIDE FRAME TUBE. FIRMLY RUB BRACKET UP AND DOWN ACROSS TUBE TO MARK CONTACT POINT OF BRACKET WITH TUBE. THIS WILL LEAVE A FAINT LINE ON THE TUBE WHICH SHOULD BE FURTHER DARKENED WITH A PENCIL. POSITION BRACKET AGAINST TUBE SO THAT HOLE IN BRACKET IS CENTERED OVER LINE (BRACKET MUST BE FLAT AGAINST TUBE) AND MARK SIDE FRAME TUBE FOR DRILLING.



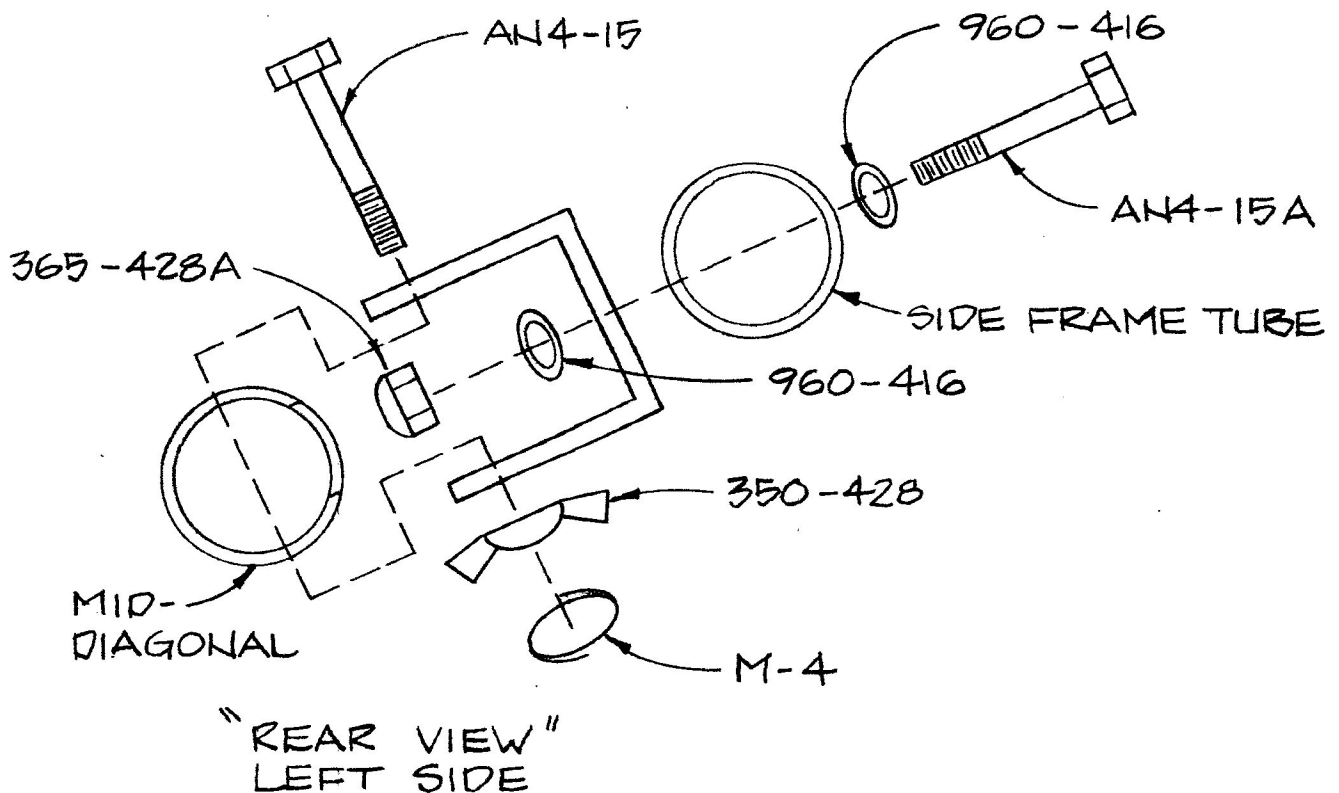
STEP #40

DISCONNECT AND REMOVE SIDE FRAME TUBE FROM UNDERCARRIAGE. INSERT A 3" WOOD DOWEL IN END OF TUBE AND POSITION AS SHOWN. DRILL 1/4" HOLE THROUGH TUBE AT PLACE MARKED FOR BRACKET. DEBURR HOLE AND REINSTALL SIDE FRAME TUBE. TIGHTEN ALL BOLTS SECURELY! USE A CENTER PUNCH PRIOR TO DRILLING. REPEAT PROCESS ON OTHER SIDE.



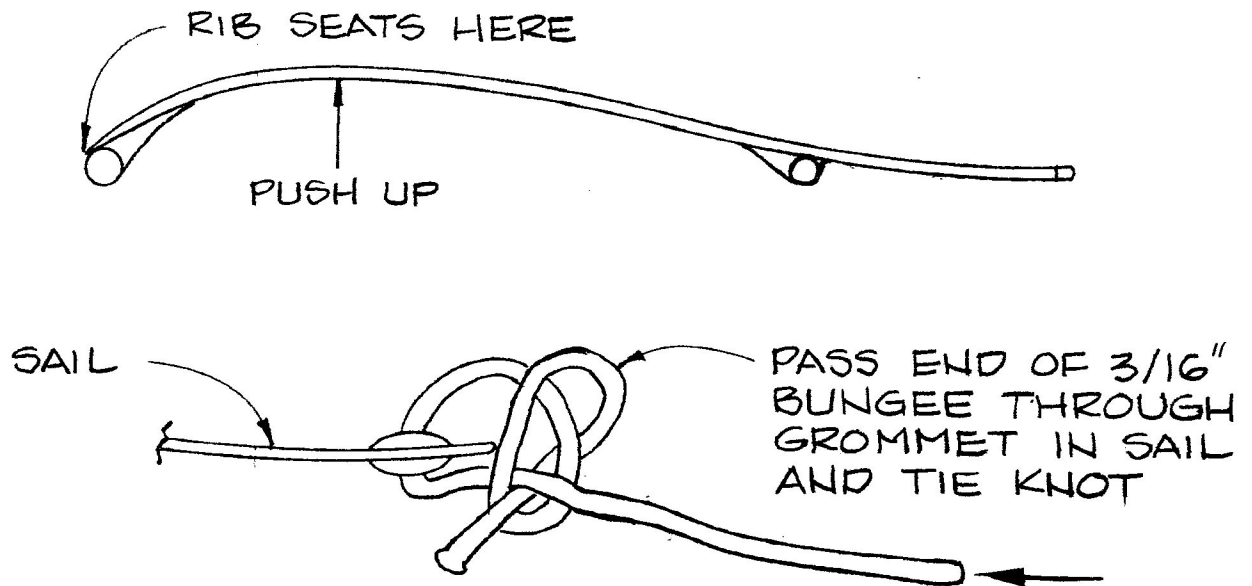
STEP #41

ATTACH MID-DIAGONAL REAR MOUNT BRACKET TO SIDE FRAME TUBE WITH PROPER HARDWARE. PLACE MID-DIAGONAL STRUT END IN BRACKET TO ALIGN BRACKET IN PROPER POSITION. REMOVE STRUT END AND TIGHTEN BRACKET MOUNT BOLT SECURELY! REATTACH STRUT END TO BRACKET WITH BOLT AND WINGNUT AND SAFETY RING.

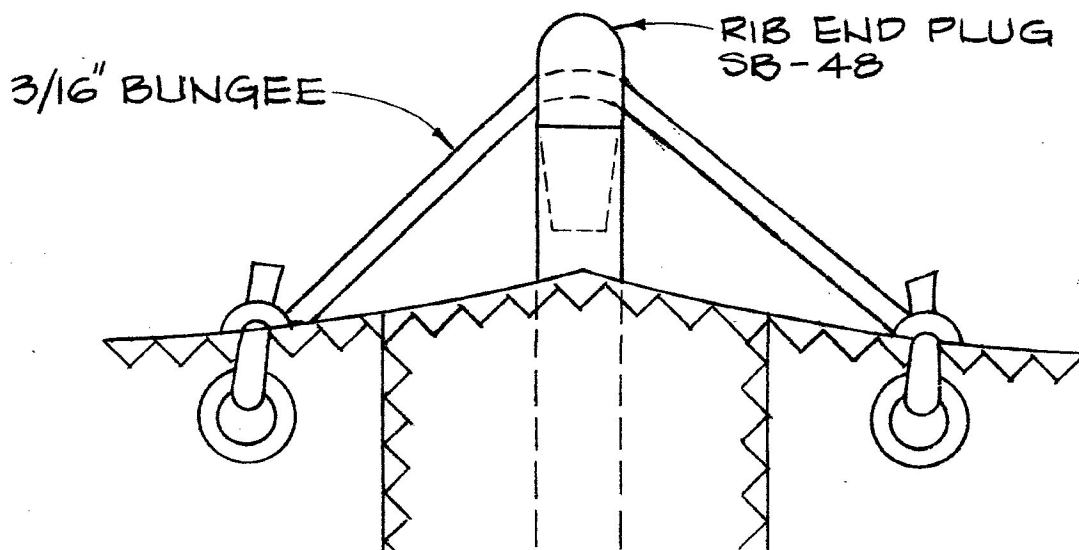


STEP #42

MATCH RIBS AGAINST RIB TEMPLATE PRIOR TO INSTALLING IN SPRAY DECK. SLIDE RIBS INTO POCKETS FROM THE REAR BEING CAREFUL NOT TO ALLOW THE RIBS TO TWIST. IF RIBS ARE ALLOWED TO TWIST, SHARP EDGES ON FRONT OF RIB MAY CUT STITCHING OF RIB POCKETS IN SPRAY DECK. HAVE A HELPER PUSH UP ON BOTTOM OF RIB POCKET WHEN INSTALLING RIBS. BE SURE RIB IS SEATED AGAINST STOP IN FRONT END OF POCKET.

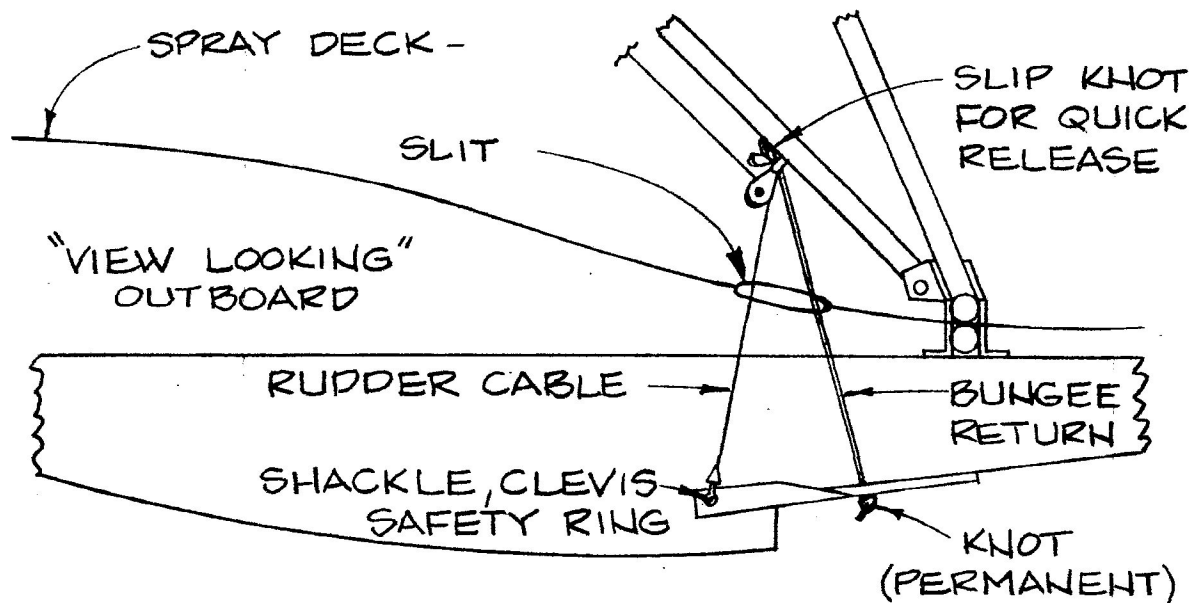


INSTALL PLUG IN RIB END AND PASS BUNGEE THROUGH HOLE IN SIDE. STRETCH BUNGEE "VERY TAUT" BEFORE TYING SECOND KNOT. CUT AND HEAT SEAL BUNGEE ENDS.



### STEP #43

CUT A PIECE OF 3/16" BUNGEE CORD 18" LONG. TIE A SECURE KNOT IN ONE END. PASS BUNGEE UPWARD THROUGH HOLE IN WATER RUDDER, UP THROUGH SLIT IN SPRAY DECK AND ATTACH WITH A SLIP KNOT TO RUDDER PULLEY SHACKLE. CONNECT RUDDER CABLE TO RUDDER ARM WITH SHACKLE, CLEVIS PIN AND SAFETY RING. REPEAT ON OTHER SIDE.



STRETCH SPRAY DECK VERY TAUT AND SEAL SIDES TO VELCRO ON PONTOONS. BEGIN AT BACK NEAR REAR SPAR AND WORK FORWARD. IT MAY BE NECESSARY TO ADJUST OR REPOSITION SPRAY DECK A FEW TIMES TO REMOVE ALL WRINKLES.

NOW GO BACK OVER EVERY NUT, BOLT, BRACKET AND FASTENER ON PONTOONS, STRUTS AND UNDERCARRIAGE TO BE SURE EVERYTHING HAS BEEN PROPERLY TIGHTENED AND SECURED. YOUR KASPERWING FLOAT PLANE IS NOW READY FOR PRE-FLIGHT. REFER TO PONTOON OPERATING INSTRUCTIONS.

## PONTOON OPERATION INSTRUCTIONS

### 1. PREFLIGHT

BEGIN PREFLIGHT CHECK IN THE NORMAL MANNER BUT ADDITIONALLY INSPECT THE FOLLOWING:

- A. ALL WINGNUTS AND SAFETIES CONNECTING STRUT ENDS TO PONTOONS OR AIRFRAME.
- B. WATER RUDDERS FOR PROPER OPERATION. HINGE PINS INSERTED FULLY INTO HINGES.
- C. LIFT FRONT HATCH COVERS AND CHECK FOR WATER INSIDE PONTOON COMPARTMENTS. CARRY A SPONGE AND PAPER CUP FOR BAILING.
- D. SPRAY DECK SEALED DOWN TO VELCRO ON PONTOONS AND RIBS IN PROPER POSITION.
- E. WHEN INSPECTING WINGTIPS, DO NOT PULL END OF WING DOWN TO YOU. USE A SHORT STEP LADDER ON DRY LAND OR PUT PLANE IN WATER AND INSPECT FROM THE DOCK.

### 2. FLYING CONDITIONS

MAKE FIRST FLIGHTS ON CALM OR NEAR CALM DAYS. IDEAL CONDITIONS FOR LEARNING ARE WHEN THE SURFACE OF THE WATER HAS SMALL RIPPLES BUT THERE IS LITTLE OR NO WIND. WHEN FLYING EXPERIENCE HAS BEEN GAINED, OPERATIONS IN WINDS UP TO 25 M.P.H. MAY BE CONDUCTED WITH CAUTION.

### 3. SLOW TAXI

PRIOR TO FLYING SPEND SOME TIME TAXIING AT SLOW SPEEDS USING WATER RUDDERS FOR MANEUVERING. DO NOT DEPLOY WATER RUDDERS AT SPEEDS ABOVE 10 M.P.H. OR DURING HIGH SPEED TAXI WHEN PONTOONS ARE ON THE STEP. PRACTICE 180° AND 360° TURNS AT 2 OR 3 M.P.H. USING WATER RUDDERS BY THEMSELVES AND TOGETHER WITH TIP RUDDERS AT SLIGHTLY HIGHER SPEEDS, 6-8 M.P.H.

### 4. CROSSWIND OPERATIONS

WHEN FLOATING ON THE WATER THE PLANE WILL HAVE A VERY PRONOUNCED TENDENCY TO WEATHERVANE IN ANY KIND OF BREEZE. TRY TO AVOID CROSSWIND OPERATIONS OF ANY GREAT DEGREE IN WINDS ABOVE 6-8 M.P.H. AS IT MAY BECOME VERY DIFFICULT OR IMPOSSIBLE TO MANEUVER CROSS- OR DOWNWIND WITHOUT A SUDDEN BURST OF POWER AND FULL APPLICATION OF WINGTIP AND WATER RUDDER IN THE DIRECTION YOU WISH TO TURN. ALWAYS TAKE OFF AND LAND DIRECTLY INTO THE WIND WHENEVER POSSIBLE.

### 5. FAST TAXI

WITH YOUR WEIGHT AS FAR AFT AS POSSIBLE, DIRECT YOUR KASPERWING INTO THE WIND AND APPLY FULL THROTTLE. AS SOON AS THE PONTOONS BEGIN TO PLANE UP ON THE STEP, HOLD YOUR WEIGHT BACK AND REDUCE THROTTLE TO ESTABLISH A STABLE, HIGH SPEED TAXI. APPLY MODERATE AMOUNTS OF LEFT AND RIGHT TIP RUDDER TO FAMILIARIZE YOURSELF WITH GENTLE S-TURNS ACROSS THE WIND UNTIL YOU FEEL COMFORTABLE RIDING ON THE STEP.



6. PORPOISING

IN GLASSY WATER, NO WIND CONDITIONS PORPOISING OR PITCHING OSCILLATIONS MAY DEVELOP AT CERTAIN CRITICAL SPEEDS DURING TAKE-OFF OR AT HIGH SPEED TAXI. THIS IS USUALLY CAUSED BY WATER FRICTION ACTING AGAINST THE PONTOONS. EITHER REDUCE POWER UNTIL OSCILLATIONS STOP OR APPLY FULL THROTTLE AND HOLD WEIGHT IN FULL AFT POSITION UNTIL LIFT-OFF OCCURS. DO NOT ATTEMPT TO CHASE OR DAMPEN OSCILLATIONS BY MAKING CHANGES IN PITCH AS THIS WILL ONLY MAKE THE PROBLEM WORSE.

7. TAKE-OFF PROCEDURE

- A. ENTER PLANE FROM THE FRONT.
- B. START ENGINE.
- C. SLOW TAXI UNTIL CLEAR OF OBSTACLES.
- D. CHECK PATTERN FOR TRAFFIC.
- E. TURN DIRECTLY INTO THE WIND.
- F. MOVE WEIGHT ALL THE WAY AFT.
- G. APPLY FULL THROTTLE.
- H. KEEP WEIGHT FULLY AFT AND WINGS LEVEL UNTIL LIFT-OFF OCCURS. MOVE FORWARD TO THE NEUTRAL TRIM POSITION AS SOON AS PONTOONS CLEAR THE WATER AND ACCELERATE TO BEST CLIMB SPEED.

8. LANDING PROCEDURE

- A. SET UP NORMAL APPROACH, LANDING INTO THE WIND.
- B. REDUCE THROTTLE AND ESTABLISH A SHALLOW GLIDE.
- C. LEVEL OFF AT ABOUT 1/3 THROTTLE, 1 OR 2 FEET ABOVE THE WATER.
- D. REDUCE POWER TO AN IDLE, GENTLY MOVE WEIGHT BACK AS PLANE SETTLES AND TOUCHDOWN OCCURS.
- E. DO NOT ATTEMPT A FULL FLARE, "BIRD-TYPE" LANDING UNTIL MORE EXPERIENCE HAS BEEN GAINED FLYING WITH THE PONTOONS. FIRST PRACTICE FLYING THE PLANE DOWN TO 1 OR 2 FEET ABOVE THE WATER, THEN THROTTLE BACK UNTIL IT SETTLES ON.
- F. WHEN MAKING POWER-OFF LANDINGS USE THE SAME PROCEDURE AS POWER-ON BUT KEEP SPEED UP MORE ON YOUR FINAL APPROACH. ABILITY TO FLARE IS LESSENED DUE TO INCREASED PENDULUM STABILITY.

9. NORMAL FLIGHT MANEUVERS AND LIMITATIONS

IN-FLIGHT HANDLING CHARACTERISTICS ARE APPROXIMATELY THE SAME, WITH THE FOLLOWING MODIFICATIONS DUE TO INCREASED DRAG AND PENDULUM STABILITY:

- A. CLIMB RATE IS REDUCED SLIGHTLY.
- B. CRUISE AND TOP SPEED ARE REDUCED.
- C. PITCH AUTHORITY IS DECREASED.

- D. MAXIMUM DIVE SPEED AND ABILITY TO PENETRATE "POWER-OFF" ARE DECREASED BECAUSE THE PILOT WILL NOT BE ABLE TO GET THE NOSE DOWN AS FAR.
- E. ABILITY TO ACHIEVE THE VORTEX FLIGHT (MUSH) MODE IS ENHANCED. THE PLANE WILL ENTER THE MUSH MODE SOONER AND SETTLE AT A MORE NEARLY VERTICAL ANGLE THAN WITHOUT PONTOONS. MORE TIME WILL BE REQUIRED TO RETURN FROM A MUSH TO NORMAL FLIGHT AND CARE SHOULD BE TAKEN NOT TO EXTEND THE MUSH TOO CLOSE TO THE WATER. INCREASED LAG TIME WILL DEMAND MORE ALTITUDE FOR RECOVERY.
- F. THE SAME OPERATING LIMITATIONS APPLY WITH REGARD TO TURBULENCE REGARDLESS OF PONTOONS.

10. PROHIBITED MANEUVERS

- A. SPINS
- B. SPIRAL DIVES
- C. WHIP STALLS
- D. AEROBATICS OF ANY KIND

11. OTHER HELPFUL TIPS

- A. ALWAYS ENTER THE PLANE FROM THE FRONT OR HALFWAY POINT FORWARD ON THE PONTOONS. TOO MUCH WEIGHT AFT WILL CAUSE THE PONTOON TO SINK, CAUSING THE PLANE TO CAPSIZE REARWARD.
- B. WHEN ENTERING FROM THE FRONT, SUPPORT YOUR WEIGHT ON PONTOON FRONT SPAR ENDS, FRONT SPAR MOUNT STRUT AND BOTTOM FRAME TUBES. BOTTOM FRAME TUBES AND ANY OTHER AREAS USED FOR STEPS SHOULD BE SPIRAL WRAPPED WITH 1" WIDE DECK TAPE SIMILAR TO THAT USED ON BOATS. THIS WILL HELP KEEP YOUR FEET FROM SLIPPING ON WET TUBES.
- C. IF IT BECOMES NECESSARY TO ENTER THE PLANE FROM THE REAR (AS WHEN PARKED ON A BEACH WITH TAILS OF PONTOONS OUT OF THE WATER), ALWAYS WALK ON THE EDGES OF THE PONTOONS, NOT ON THE HATCHES OR THE FLEXIBLE TOP PORTION OF THE PONTOON. THIS WILL HELP EXTEND PONTOON LIFE.
- D. WHEN LANDING AND OPERATING IN CHOPPY WATER OR WINDY CONDITIONS, IT MAY NOT BE POSSIBLE TO TAXI CROSSWIND OR TURN DOWNWIND. NEVER ATTEMPT TO FORCE THE PLANE DOWNWIND IN WINDS GREATER THAN 8-10 M.P.H. BECAUSE A PONTOON OR WINGTIP MAY CATCH, CAUSING THE PLANE TO CAPSIZE. SIMPLY TAXI OR FLY UPWIND OF YOUR INTENDED DESTINATION AND REDUCE POWER TO AN IDLE, KEEPING THE ENGINE RUNNING. THE PLANE WILL BEGIN TO DRIFT BACKWARD IN THE WIND AND CAN BE STEERED BY USING TIP RUDDERS IN REVERSE FOR DIRECTIONAL CONTROL. ALWAYS LEAVE THE ENGINE RUNNING AND KEEP YOUR WEIGHT FORWARD WHEN DRIFTING REARWARD IN THE WIND. YOU WILL FIND THAT THE PLANE WILL DRIFT QUITE RAPIDLY REARWARD AND IF THE ENGINE QUILTS, YOUR ABILITY TO MANEUVER WILL BE LIMITED. YOU COULD BE BLOWN DOWNWIND INTO A DOCK, ROCKS, PILINGS, ETC., CAUSING DAMAGE TO THE PONTOONS OR EVEN TOTAL LOSS OF THE PLANE DUE TO CAPSIZING.

- E. WHEN MANEUVERING REARWARD, ALLOWING THE PLANE TO DRIFT IN THE WIND, KEEP YOUR WEIGHT AT LEAST IN NEUTRAL POSITION OR FURTHER FORWARD. WHEN YOUR WEIGHT IS AFT OF NEUTRAL, A GUST OF WIND CAN RAISE THE NOSE SLIGHTLY OR A WAVE BREAKING OVER THE BACK OF THE PONTOONS CAN CAUSE THEM TO "CATCH". WHEN THIS HAPPENS, THE FORCE OF THE WIND PUSHING THE PLANE BACKWARDS WILL CAUSE THE REAR OF THE PONTOONS TO DIVE LIKE A SUBMARINE, RESULTING IN THE PLANE CAPSIZING REARWARD.
- F. WHEN TAXIING FORWARD AT LOW OR HIGH SPEEDS, ALWAYS KEEP YOUR WEIGHT AS FAR AFT AS POSSIBLE. THIS KEEPS THE BOWS OF THE PONTOONS UP AND IN CHOPPY CONDITIONS THE PILOT WILL STAY MUCH DRIER.
- G. DOWNWIND LANDINGS - SOMETIMES IT MAY NOT BE POSSIBLE TO LAND INTO THE WIND DUE TO TERRAIN, BOATS, TURBULENCE, ETC. AND WHEN 10-20 HOURS OF EXPERIENCE HAS BEEN GAINED, IT IS SOMETIMES MUCH MORE PRACTICAL TO LAND DIRECTLY DOWNWIND. KEEP YOUR AIR SPEED UP, MAKE THE TOUCHDOWN AS GENTLE AS POSSIBLE, REDUCE POWER QUICKLY TO AN IDLE AND MOVE YOUR WEIGHT ALL THE WAY REARWARD. THIS WILL REDUCE TRAUMA TO THE PONTOONS DUE TO BATTERING FROM SWELLS OR WAVES. AS SOON AS THE PLANE SLOWS TO A STOP, ALLOW IT TO WEATHERVANE INTO THE WIND AND TAXI TO YOUR DESTINATION. DO NOT ATTEMPT DOWNWIND LANDINGS IN WINDS EXCEEDING 20 M.P.H. OR IN SWELLS OR CHOP EXCEEDING ONE FOOT.
- H. REPAIRS - HOLES, CRACKS OR SCRATCHES IN THE PONTOONS CAN BE REPAIRED WITH POLYESTER OR EPOXY FIBERGLASS RESIN AND GLASS CLOTH ROVING OR MATT. IF YOU AVOID WATER-BORN OBSTACLES, SUBMERGED ROCKS, LOGS, BUOYS AND THE LIKE, OR LANDING ON DRY LAND OR GRAVEL, YOU CAN AVOID THIS PART ALTOGETHER.