

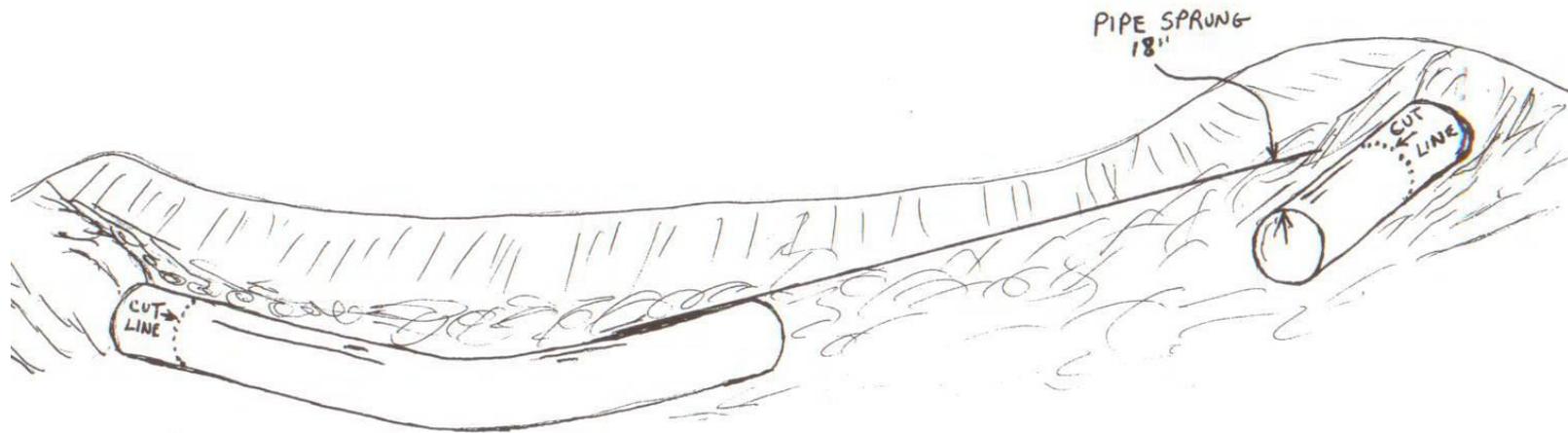
TRANSCANADA
FOOTHILLS
36" PIPE DIG PROGRAM, 2007
SITE # 02A
FERNIE B.C.

9 - PAGES

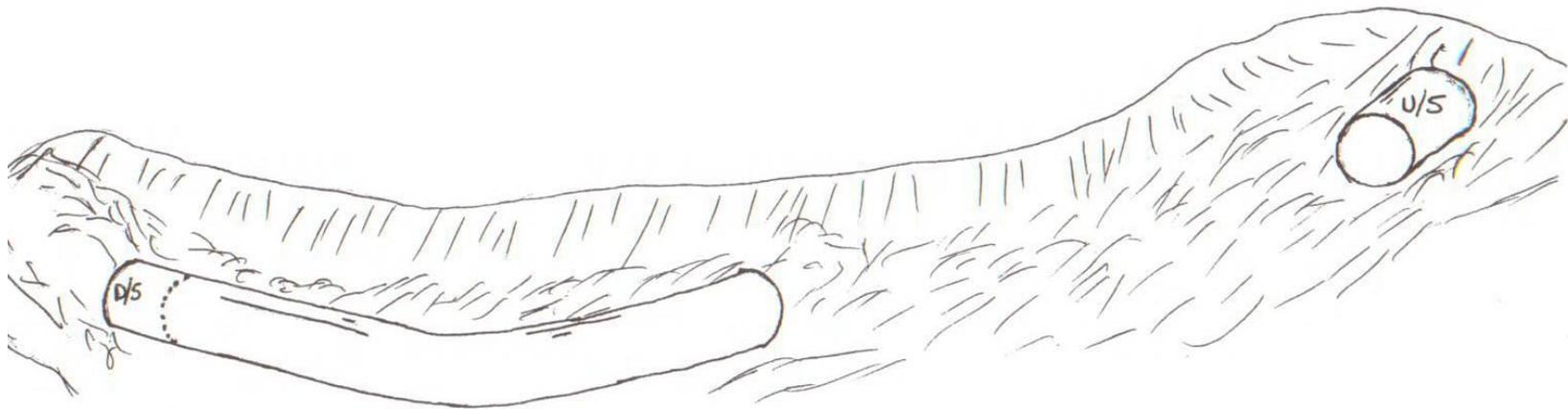
SITE #02A TRANSCANADA, FOOTHILLS 36" PIPE DIG PROGRAM, SUMMER OF 2007. THIS IS HOW THE PIPE LOOKED AFTER EXPOSURE. DUE TO CORROSION CRACKING THIS 3 JOINT SECTION WAS TO BE REPLACED. WHAT FOLLOWS IS THE SEQUENCE OF HOW IT WAS DONE. THERE WAS ON THE UPSTREAM SIDE (U/S) A ROLLED SIDE BEND, AND ON THE DOWN STREAM (D/S) SIDE A SAG. IN BETWEEN THE 2 THERE IS A STRAIGHT DROP IN JOINT



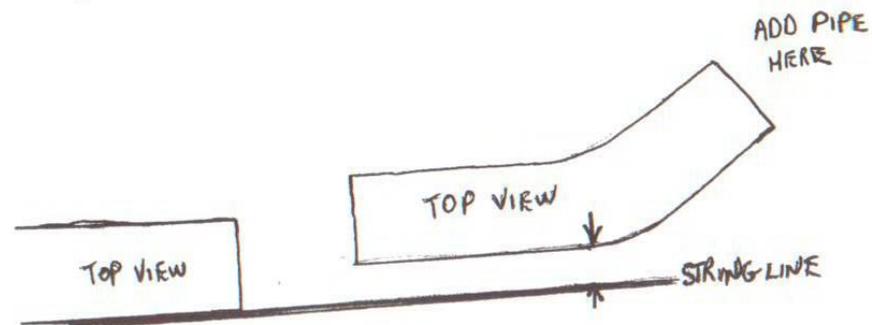
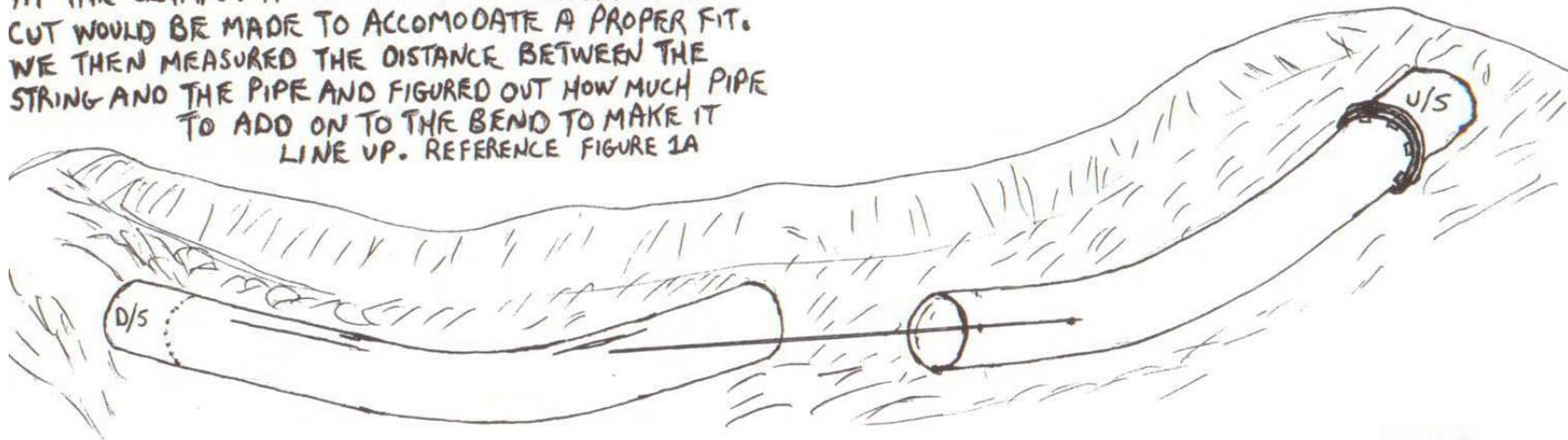
THIS IS HOW THE SITE LOOKED WHEN REPLACEMENT CREW ARRIVED. SIDE BEND HAD ALREADY BEEN REMOVED, AND THE SAG UPON STRING LIVING HAD SPRUNG UP APPROX. 18". SURVEY HAD MARKED CUT LINES ON THE PIPE. REPLACEMENT PIPE WAS ALREADY BENT AND ON SITE.



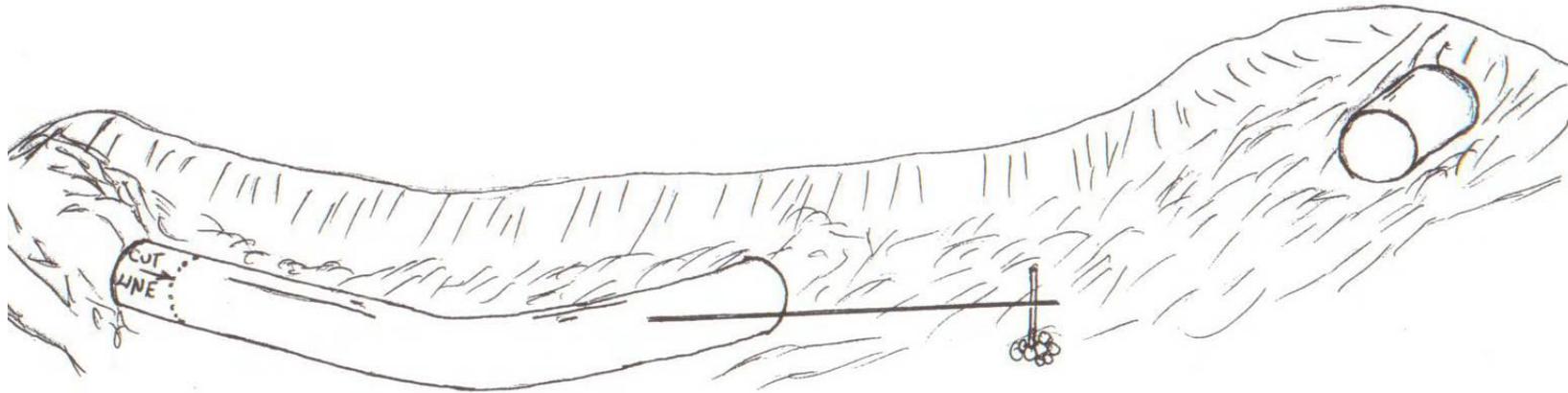
BECAUSE THE SIDE BEND WAS REMOVED WE HAD
NO IDEA OF ITS DIMENSIONS. THE SAG BEING STILL
THERE AFFORDED US A PLACE TO SHOOT OUR NEW BEND
TO. WE THEN CUT THE U/S SIDE AT THE CUT MARKS
AND PUT THE PIPE CLAMPS ON U/S SIDE



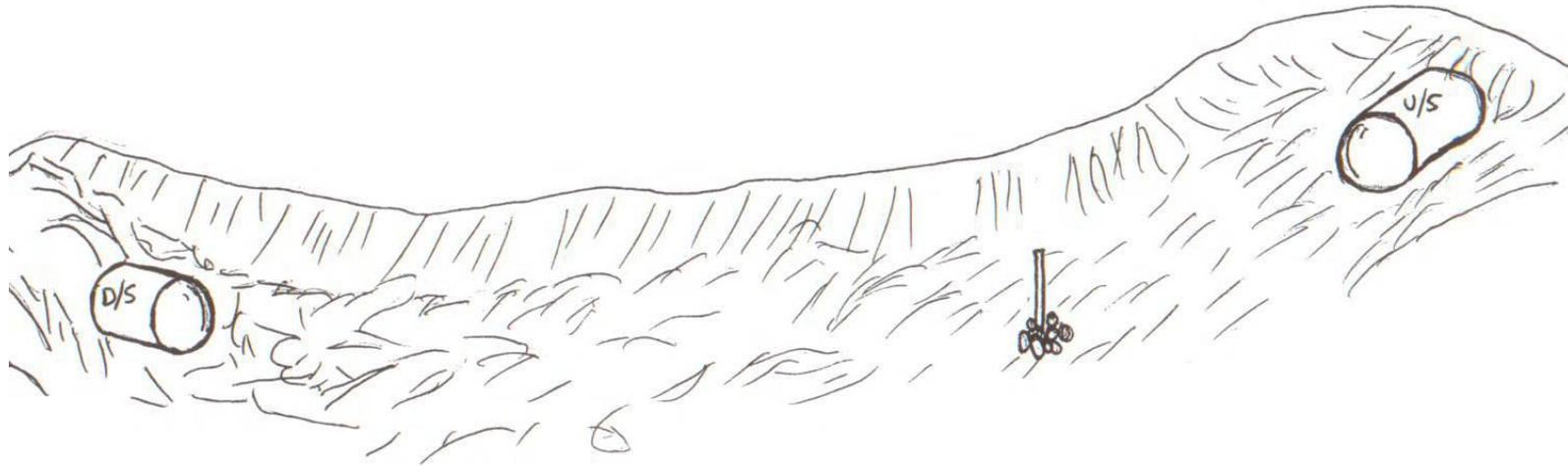
AFTER CUTTING U/S SIDE WE PLACED THE NEW BEND IN THE CLAMPS AND ROLLED IT AS YOU SEE BELOW. THE FIT AT THE CLAMPS WAS SQUARE AND THE ROLL OF THE BEND WAS SQUARE TO THE DOWN STREAM PIPE ACCORDING TO THE STRING LINE. IF THE BEND WAS NOT SQUARE TO THE D/S PIPE, THE BEND WOULD HAVE BEEN MOVED BACK AND FORTH TO MAKE IT SO. THIS WOULD HAVE CHANGED THE FIT AT THE CLAMPS. IF IT WASN'T WELDABLE A NEW CUT WOULD BE MADE TO ACCOMODATE A PROPER FIT. WE THEN MEASURED THE DISTANCE BETWEEN THE STRING AND THE PIPE AND FIGURED OUT HOW MUCH PIPE TO ADD ON TO THE BEND TO MAKE IT LINE UP. REFERENCE FIGURE 1A



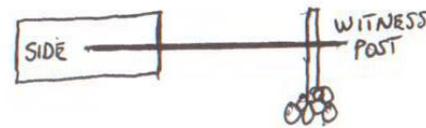
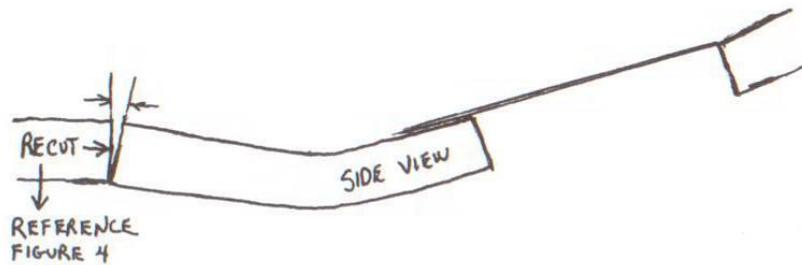
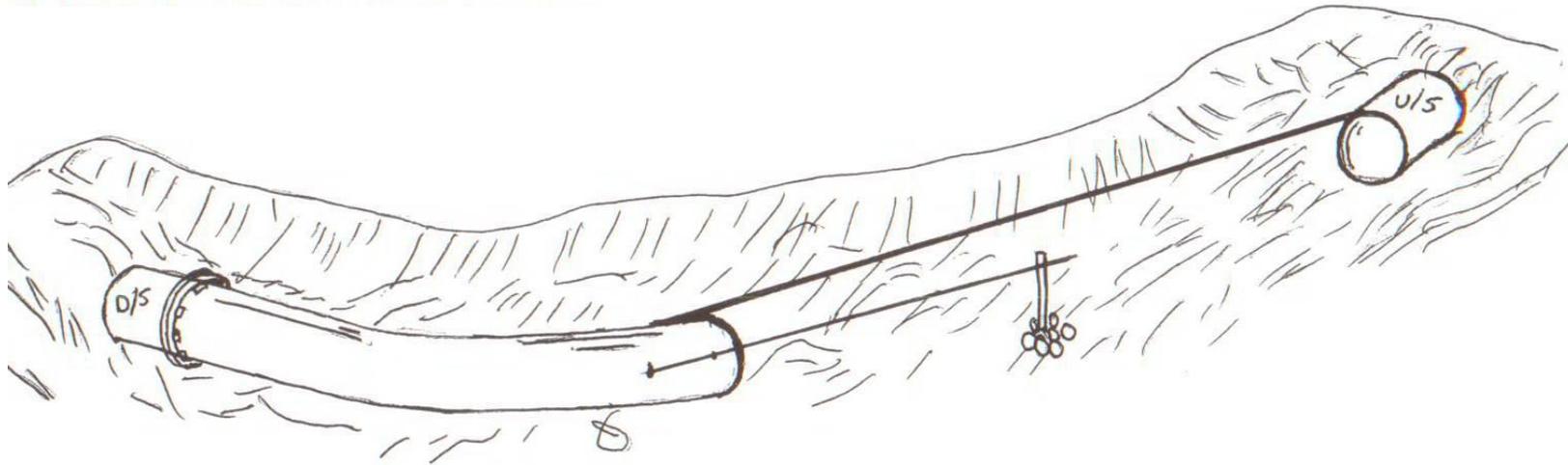
AFTER TAKING OUT BEND AND ADDING EXTRA PIPE TO IT, WE FOCUSED ON REMOVING THE DOWN STREAM SAG. BEFORE DOING THIS A WITNESS POST WAS SET UP AS BELOW. THIS WAS DONE TO MAKE SURE THE NEW SAG WOULD BE IN THE SAME PLACE SIDE TO SIDE AS THE OLD. PIPE WAS THEN CUT AND REMOVED



SITE AFTER ALL PIPING WAS REMOVED
NOTE WITNESS POST IS NOT TO BE TOUCHED
UNTIL D/S PIPE IS WELDED IN PLACE

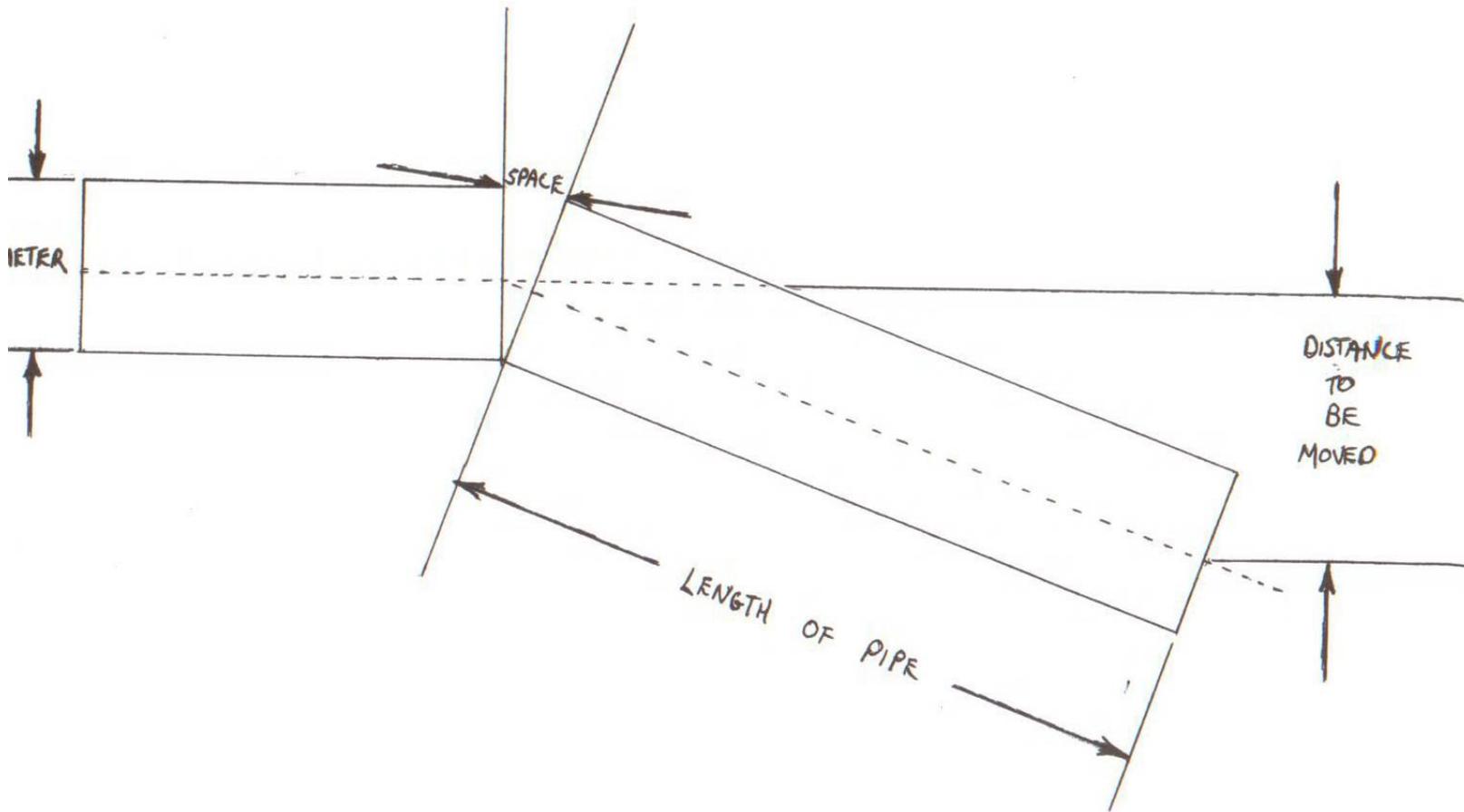


UPON PUTTING IN NEW SAG IN CLAMPS WE FIRST RUN A STRING FROM THE TOP OF SAG TO THE TOP OF THE U/S CUT. WE HAD TO LOWER THE D/S SAG TO SQUARE IT TO THE U/S CUT. WE THEN MOVED THE SAG SIDE TO SIDE TO SQUARE TO THE WITNESS POST. RECUTTING THE DOWN STREAM SIDE WAS REQUIRED FOR A PROPER FIT. ONCE DONE JOINT WAS WELDED ON AFTER RESTRINGING AS PRIORLY STATED

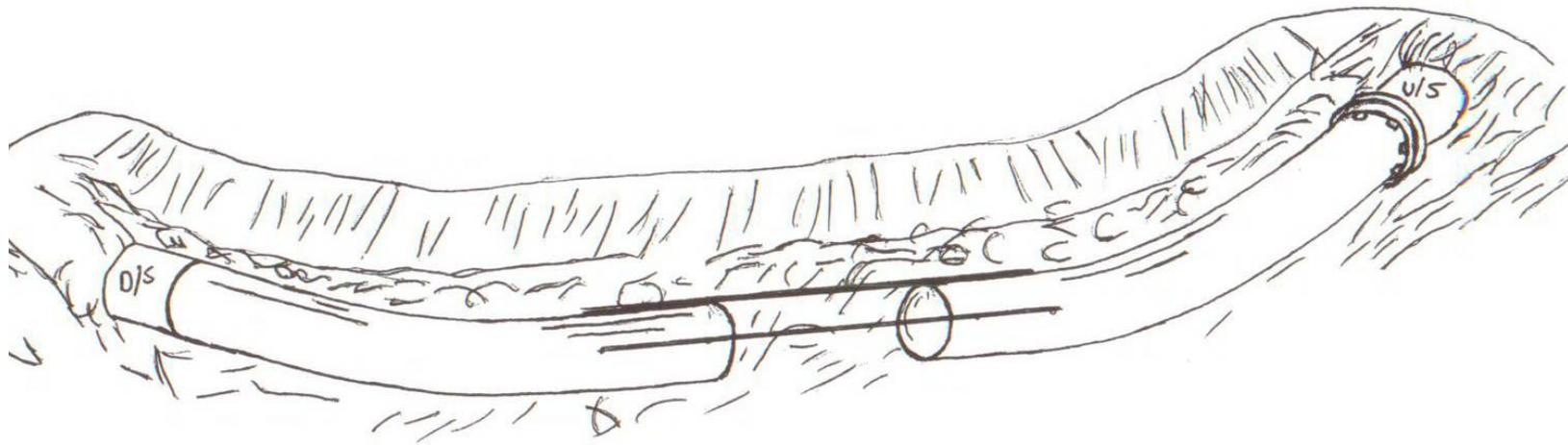


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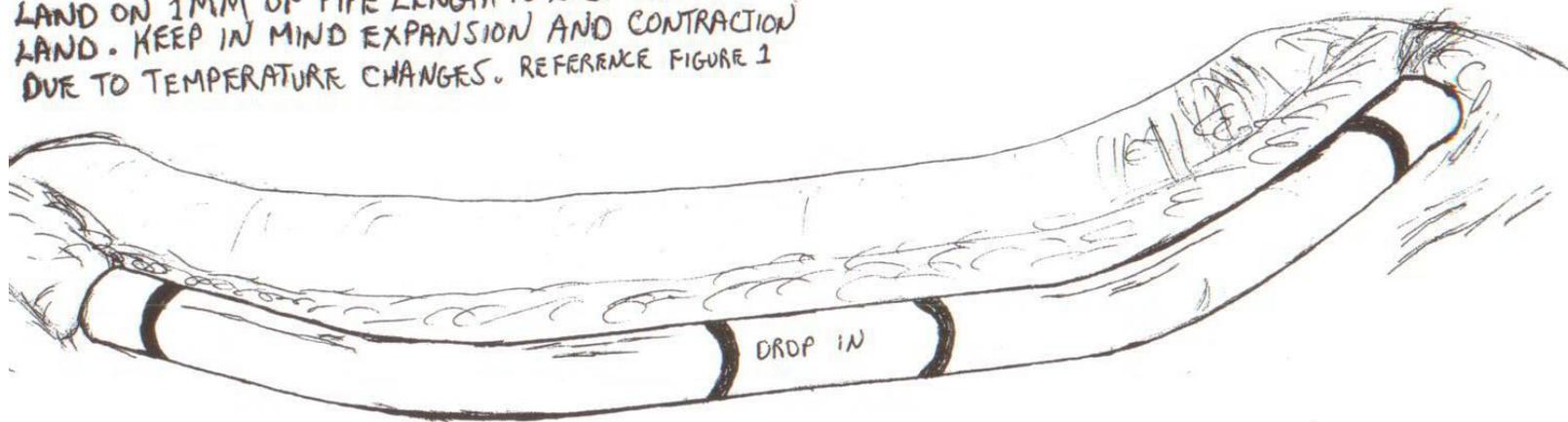
$$(\text{LENGTH OF PIPE} \div \text{DIAMETER}) \times \text{SPACE} = \text{DISTANCE TO BE MOVED}$$



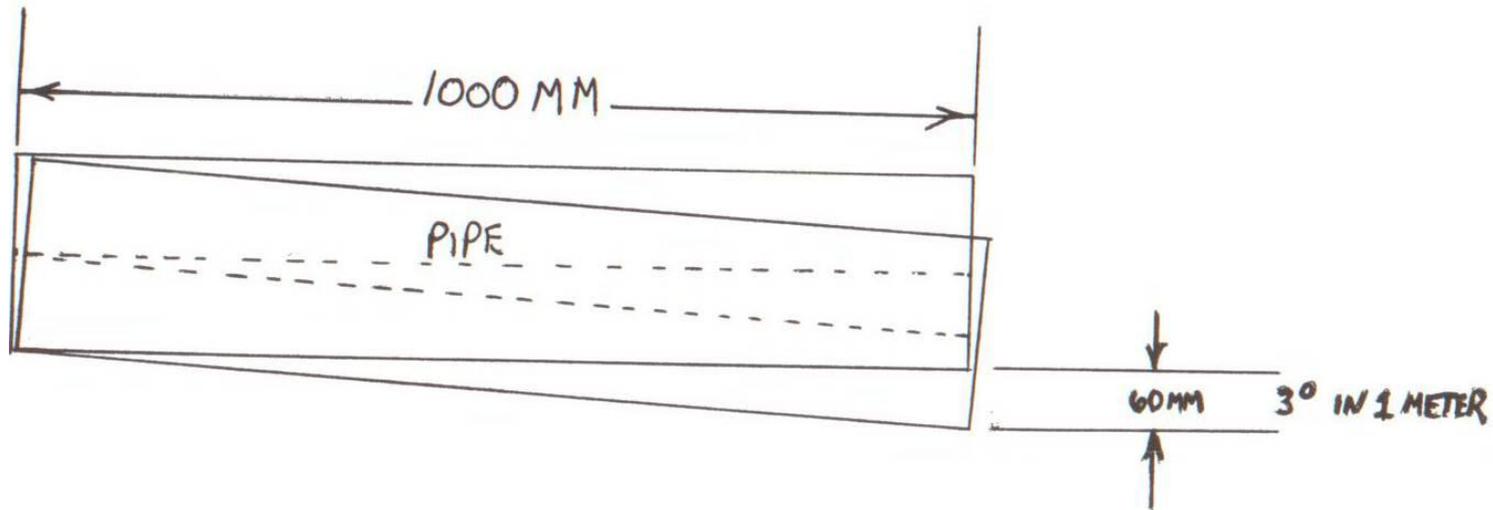
D/S JOINT WAS SKIDED WITH A SLIDER AFTER IT WAS WELDED. LENGTHENED SIDE BEND WAS THEN PUT IN AND LINED UP TO D/S SAG AS PICTURED BELOW, AND WELDED IN PLACE. A STRAIGHT DROP IN WAS THE NEXT ORDER OF BUSINESS



THE STRAIGHT DROP IN WAS PUT IN
AFTER CHECKING MEASUREMENT OF
TOP + BOTTOM AND SIDE TO SIDE. SQUARENESS
OF BOTH D/S + U/S CUTS WAS ALSO CHECKED.
IF ONE OR BOTH ARE BADLY OUT OF SQUARE
RE CUTS ARE TO BE DONE. ALWAYS CUT THE DROP
IN TO FIT THE D/S + U/S CUTS, REMEMBER WHEN
DRESSING UP ENDS WHEN YOU PUT YOUR 2MM
LAND ON 1MM OF PIPE LENGTH IS LOST FOR EACH
LAND. KEEP IN MIND EXPANSION AND CONTRACTION
DUE TO TEMPERATURE CHANGES. REFERENCE FIGURE 1



3° DEFLECTION MAXIMUM ALOUD

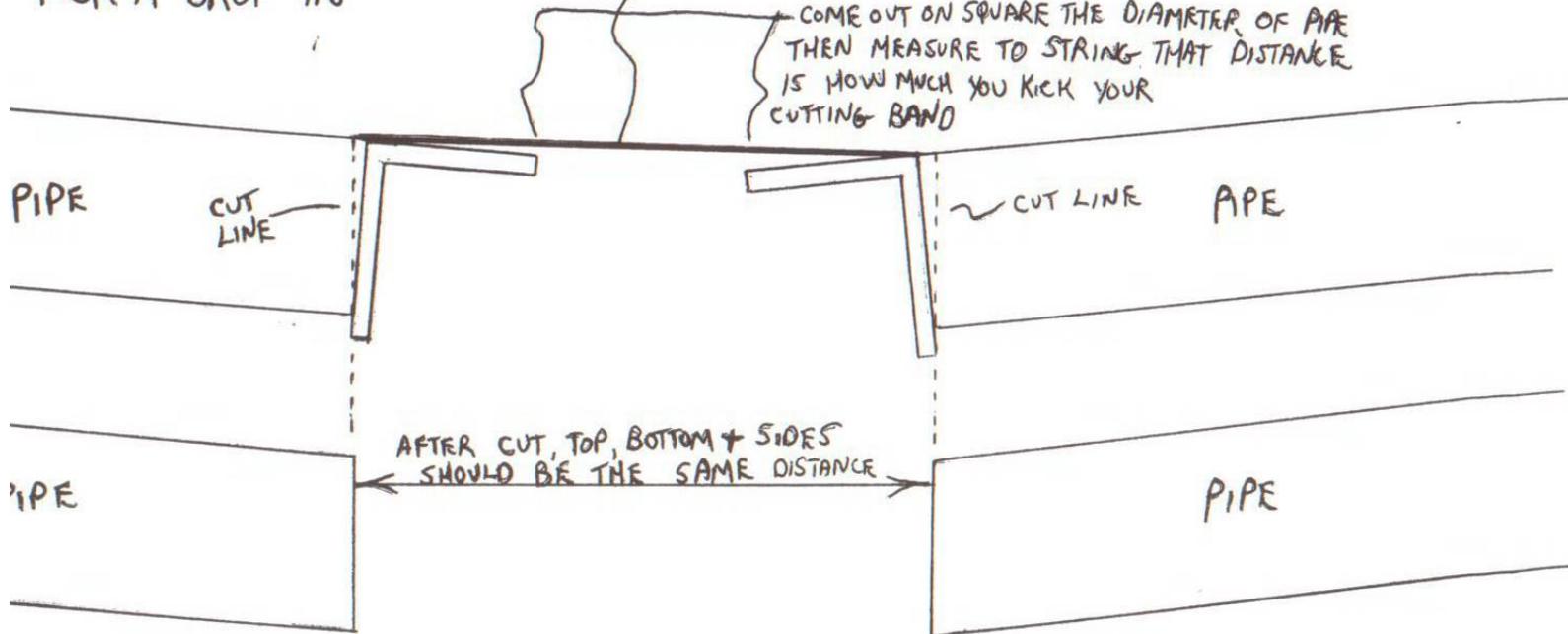


3° MITRE - PIPE WILL BE OUT OF SQUARE
60 MM FOR EACH 1000 MM (1 METER)

PIPE
CUTTING DITCH PIPE
FOR A DROP IN

STRING LINE TOP DEAD
CENTRE AND HELD AT END OF PIPES
SAME DONE ON SIDES

COME OUT ON SQUARE THE DIAMETER OF PIPE
THEN MEASURE TO STRING THAT DISTANCE
IS HOW MUCH YOU KICK YOUR
CUTTING BAND



BAND CAN BE KICKED
12MM MAX. IF MORE IS TO
BE CUT THEN CUT OFF PIECE
TO BE WELDED IN.



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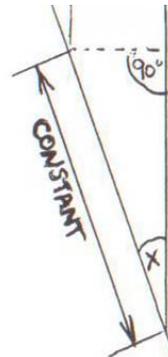
SIDE TO SIDE ALNEMENT OF SIDE BENDS

ALNEMENT STANCE

STANCE = PIPE
ADD TO
LINE
PIPE

ALNEMENT DISTANCE
ALNEMENT CONSTANT
 \times CONSTANT = BE ADDED OR SUBTRACTED

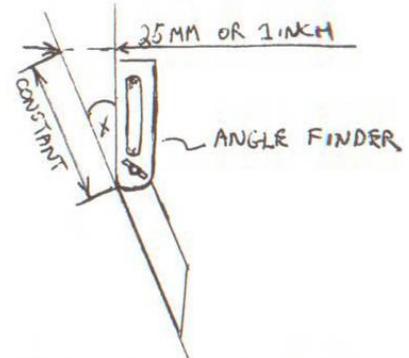
ADD PIPE TO
HERE



ALNEMENT CONSTANT

TRIANGLE ①
IF YOU CHOOSE AN
ALNEMENT CONSTANT
OF ONE INCH,
CONSTANT WILL
EQUAL A LENGTH
PER INCH

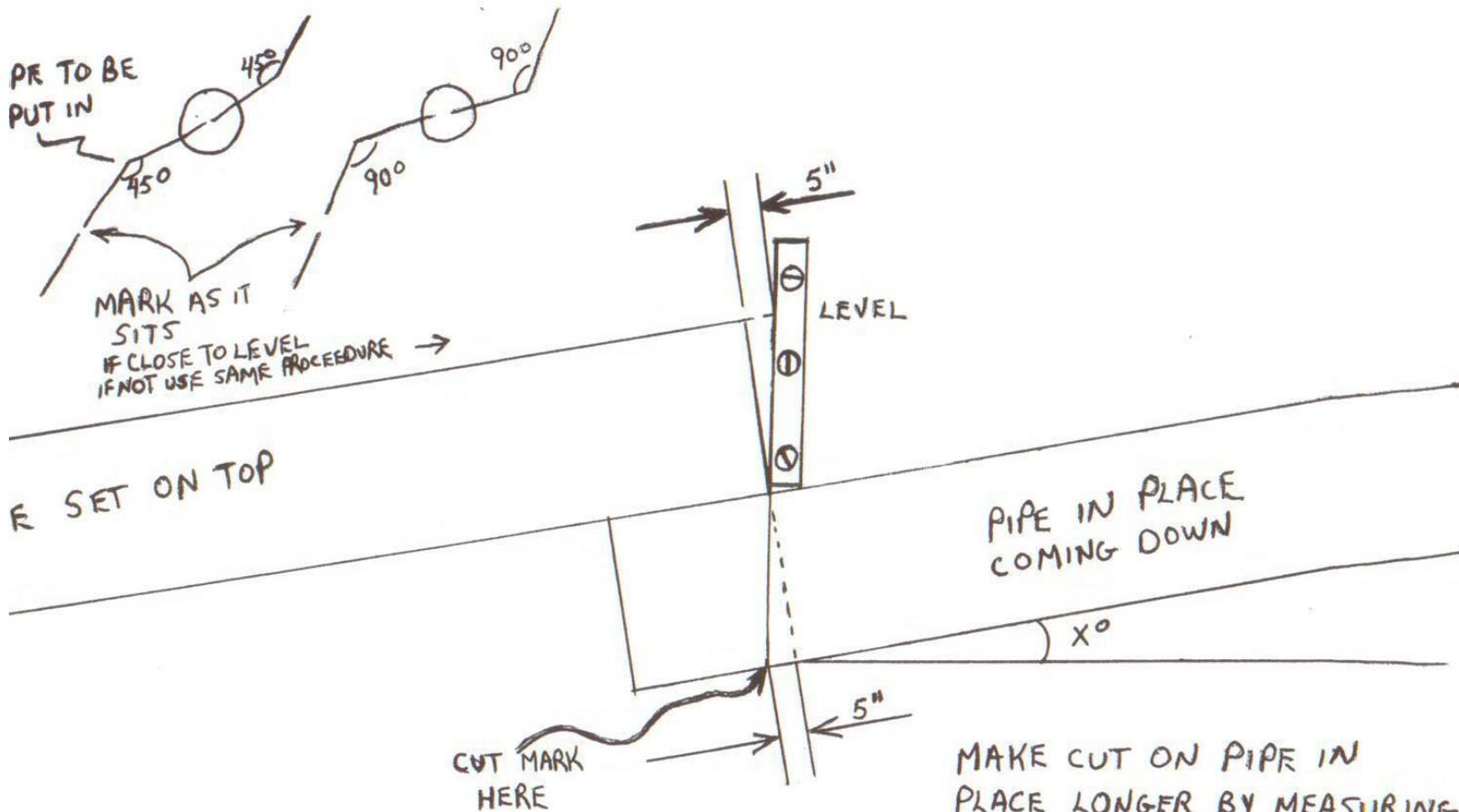
ALNEMENT DISTANCE



NOTE:
USE ANGLE FINDER TO FIND
CONSTANT OR BEND A WELDING
ROD, ON A FLAT SURFACE DRAW
A TRIANGLE LIKE ① TO FIT YOUR
ALNEMENT CONSTANT

SUBTRACT PIPE
FROM HERE

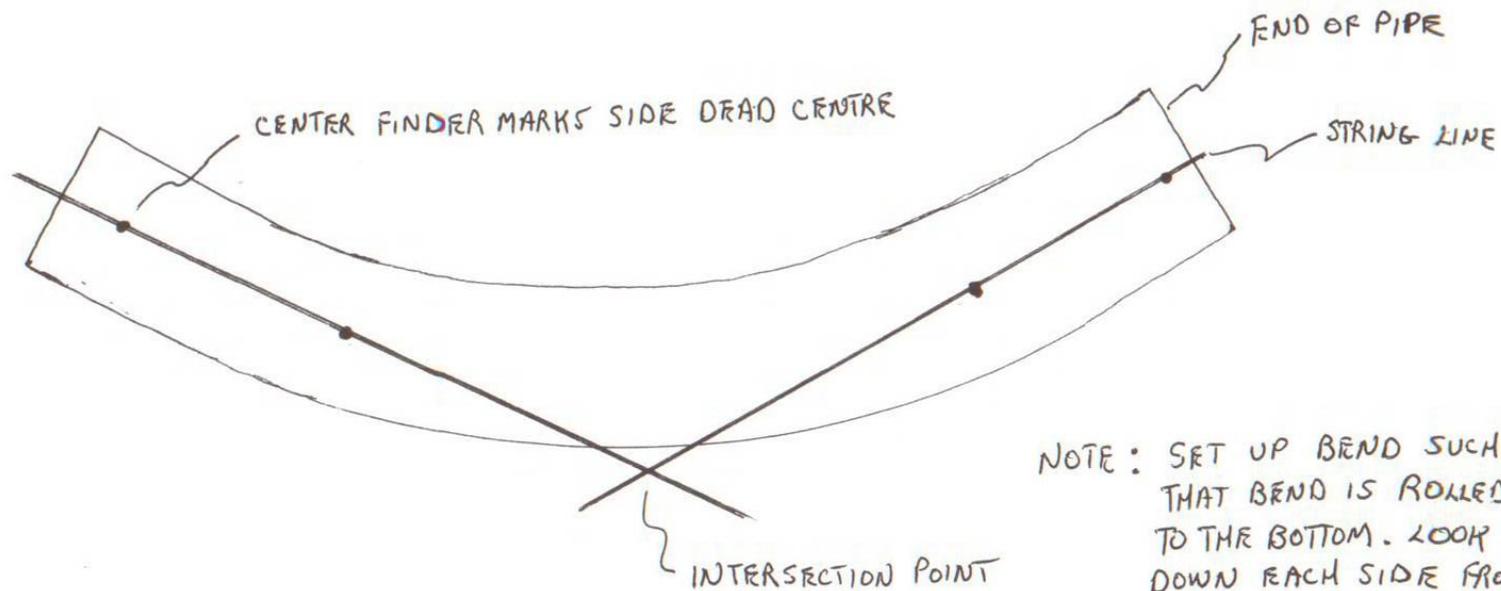
MEASURING PULLING TO OFF SET OR STRAIGHT 90°



MAKE CUT ON PIPE IN
PLACE LONGER BY MEASURING
TOP PIPE FROM END TO
LEVEL. MAKE CUT SHORTER
IF PIPE IN PLACE IS LOOKING
UP. (THIS IS NOT A MITRE CUT)

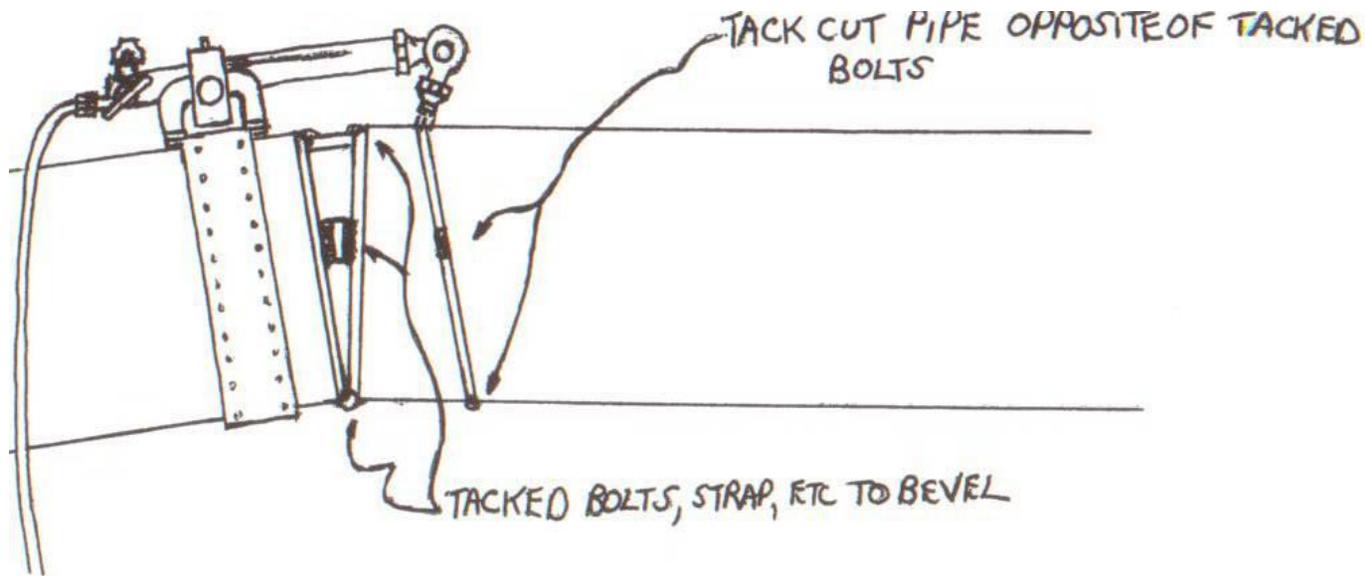
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FIND CENTER OF BENDS MEASUREMENT



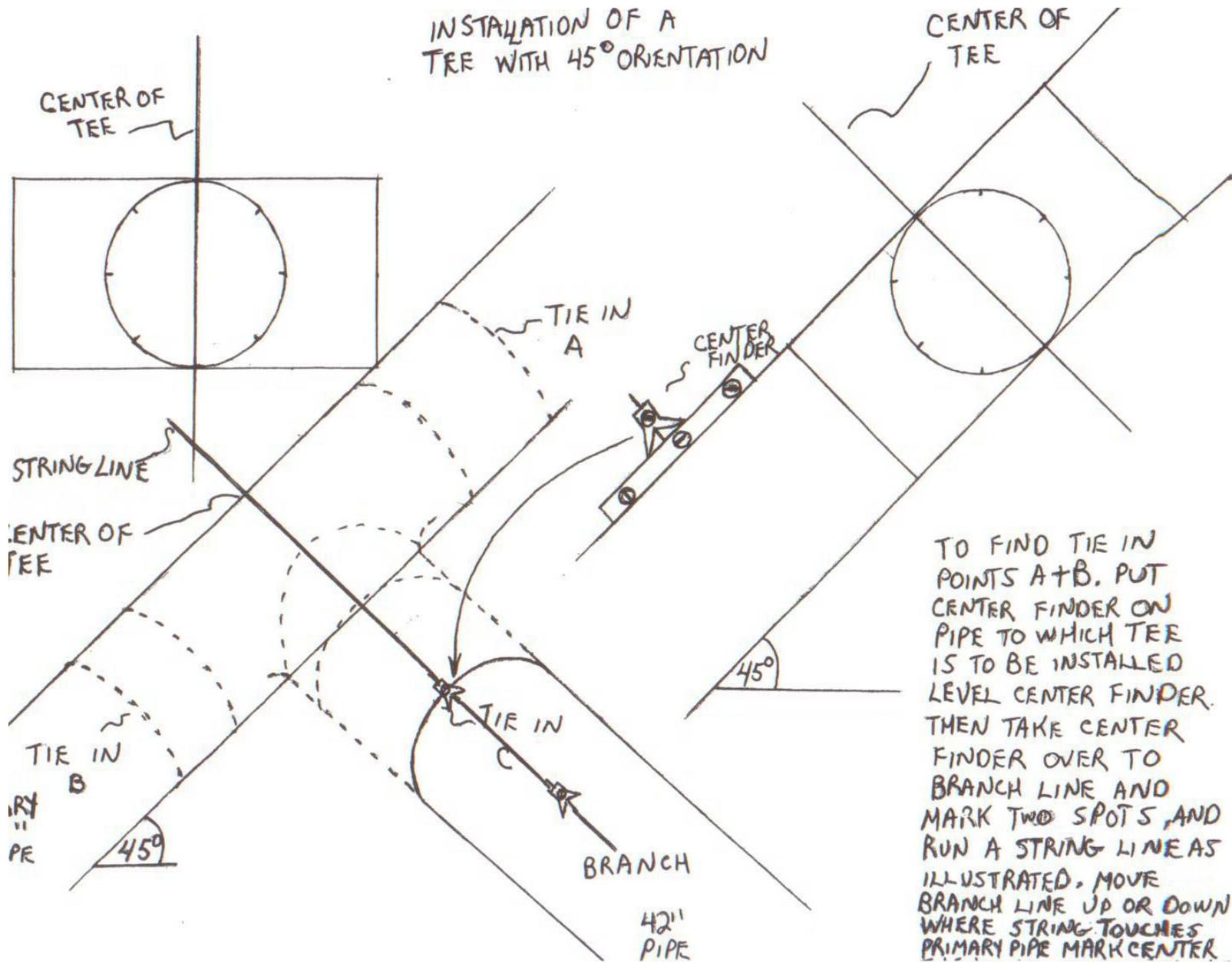
NOTE: SET UP BEND SUCH THAT BEND IS ROLLED TO THE BOTTOM. LOOK DOWN EACH SIDE FROM ONE END OF PIPE. PIPE WILL LOOK STRAIGHT ON BOTH SIDES IF BEND IS ROLLED COMPLETELY TO THE BOTTOM. PUNCH PIPE WITH CENTER FINDER, AND RUN STRING LINES. MEASURE END OF PIPE TO INTERSECTION POINT.





BACK BEVELING WHEN KICKING
BEVELING BAND IS NOT ENOUGH.
BEFORE CUTTING PUT PIPE IN CLAMPS
AND ALINE TO WHERE NEEDED.
TACK ALINED PIPE IN FOUR EQUAL
QUADRANTS. REMOVE CLAMPS. CUT
AROUND PIPE AND TACK CUT BACK
TOGETHER OPPOSITE OF TACKED BOLTS.
ONCE CUT REMOVE BAND + TORCH AND
GRIND OUT TACKS, PREP BEVELS,
FIT UP AND WELD.

INSTALLATION OF A
TREE WITH 45° ORIENTATION



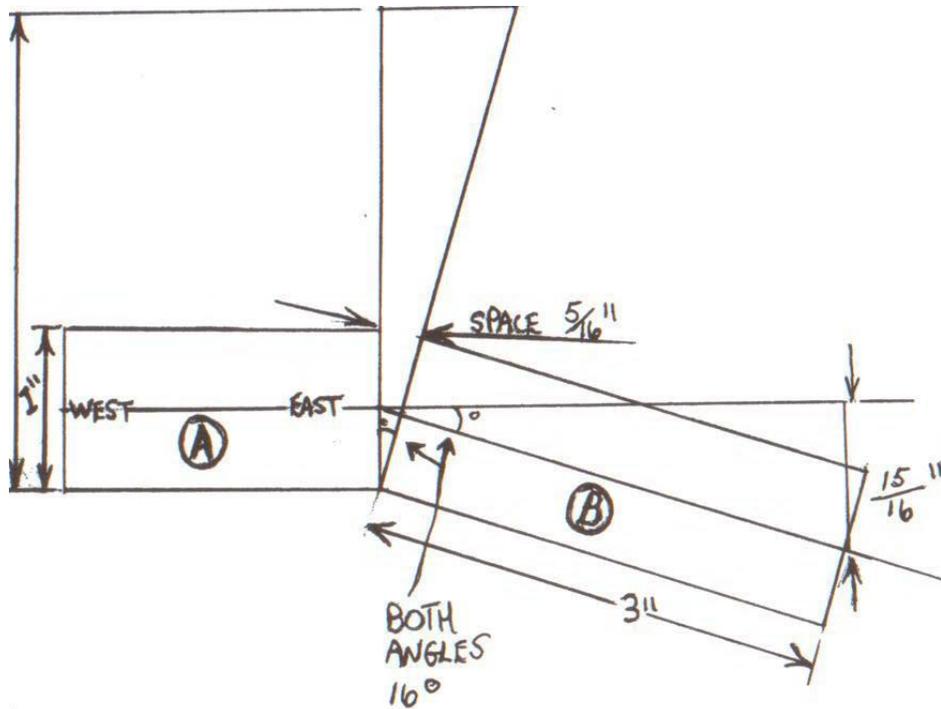
TO FIND TIE IN
POINTS A+B. PUT
CENTER FINDER ON
PIPE TO WHICH TEE
IS TO BE INSTALLED
LEVEL CENTER FINDER.
THEN TAKE CENTER
FINDER OVER TO
BRANCH LINE AND
MARK TWO SPOTS, AND
RUN A STRING LINE AS
ILLUSTRATED. MOVE
BRANCH LINE UP OR DOWN
WHERE STRING TOUCHES
PRIMARY PIPE MARK CENTER.

$$(T) = H \times 1.414$$

$$(T) = H \times 2$$

$$(T) = H \times 1.1547$$

DETERMINING TRAVEL FOR 45° 30° AND 60° ANGLES WITH HEIGHT ONLY



$$(3 \div 1) \times \text{SPACE} = \frac{15}{16}$$

$$(3) \text{SPACE} = .9375$$

$$\frac{1}{3}(3) \text{SPACE} = .9375 \left(\frac{1}{3}\right)$$

$$\text{SPACE} = .3125$$

$$\text{SPACE} = \frac{5}{16}$$

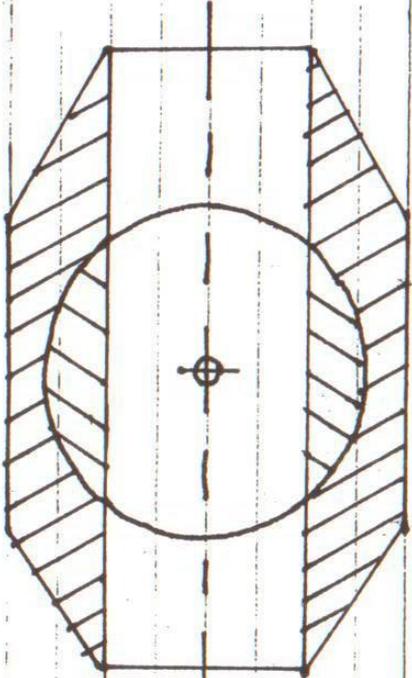
THE CUT MUST BE LEVEL OR MITRE WILL VARY IN DEGREES.

IF THE EAST END OF PIPE A IS LOOKING UP THE MITRE ON PIPE B WILL BE GREATER. THE OPPOSITE IS TRUE WHEN PIPE A IS LOOKING DOWN.

TO MAKE PIPE A CUT LEVEL PUT CUTTING BAND ON FAIRLY LOOSE PUT A LEVEL ON THE EDGE OF THE CUTTING BAND AT THE THREE O'CLOCK POSITION. TAP THE BAND ON TOP AND BOTTOM UNTIL LEVEL. DOING A MITRE THIS WAY WILL USUALLY GET YOU A MAXIMUM DIFFERENCE FROM TOP TO BOTTOM OF 12MM ($\frac{1}{2}$ " (TAPING BAND TOP + BOTTOM)

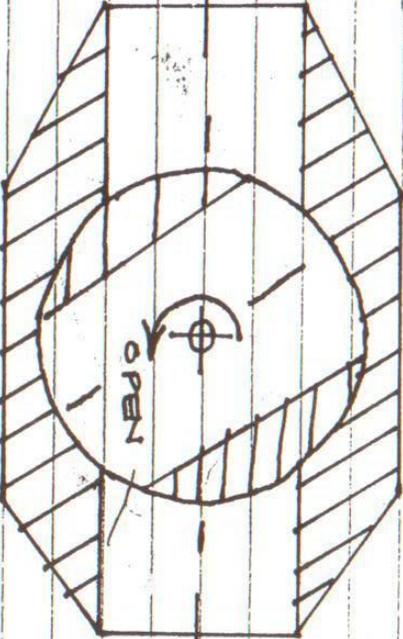
VALVE ORIENTATION FOR WELDING

FULL OPEN



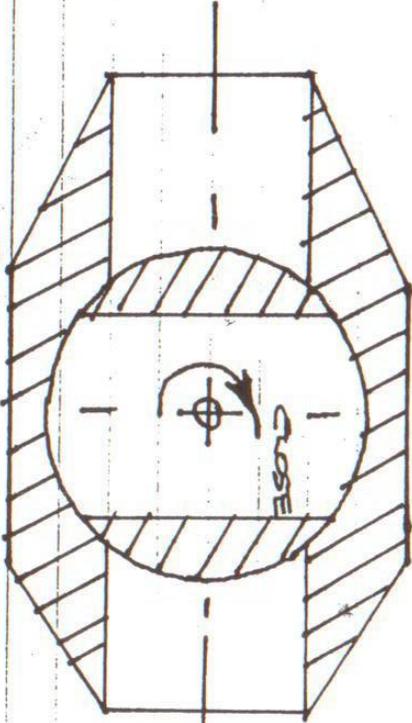
FLOW

PARTIAL OPEN



FLOW

FULL CLOSE



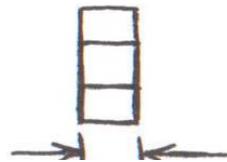
FLOW

40° ELBOW	SHORT RADIUS	CENTER = DIAMETER	
90° ELBOW	LONG RADIUS	CENTER = DIAMETER X 1.5	
90° ELBOW	3D RADIUS	CENTER = DIAMETER X 3	
45° ELBOW	LONG RADIUS	CENTER = DIAMETER X .625	
45° ELBOW	3D RADIUS	CENTER = DIAMETER X 1.2425	} 16" AND UP CAN VARY UP TO 2" DEPENDING ON MANUFACTURER'S SPECS
30° ELBOW	3D RADIUS	CENTER = DIAMETER X 0.803	
60° ELBOW	3D RADIUS	CENTER = DIAMETER X 1.73	

STRUCTURAL WELDING ONE PASS FILET WELD

ONE WELDER CUTTING AND FITTING CAN WELD 45 LINEAL INCHES IN ONE HOUR IF IT IS NEW STRUCTURAL WELDING TO BE DONE WITH NO ENGINEERING TO BE DONE

FLANGE BOLT SIZE CAN BE DETERMINED BY MEASURING THE WIDTH OF THE NUT TO FIT IT



COMPOUND MITERS AND FITTINGS

SIKAIKONH COUNTY
2010 GRAVE 4 34 ST. ED.

