

CHOOSE YOUR OWN ♦♦♦

Tale of the Resolution!



THIS ISSUE:
JOB ON THE JR

VOL. II, NUMBER 1
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WHY DO EARTHQUAKES OCCUR? CAN WE PREDICT WHEN THEY WILL STRIKE? AS PART OF AN AMAZING INTERNATIONAL RESEARCH PROGRAM, A GROUP OF SCIENTISTS AND TECHNICIANS ON BOARD A DEEP SEA DRILLING VESSEL CALLED THE JOIDES RESOLUTION ARE SEEKING ANSWERS TO QUESTIONS LIKE THESE.

THIS HUGE 471-FT RESEARCH SHIP IS AN IMPORTANT TOOL FOR RESEARCHERS BECAUSE IT ALLOWS THEM TO DRILL AND RECOVER CYLINDRICAL CORES FROM THE DEEP SEA FLOOR AND DEPLOY SPECIAL TOOLS, CALLED "ACORKS," TO RECORD DATA FROM THE SEA FLOOR AND EVEN BENEATH IT. TO SEE WHAT AN ACORK LOOKS LIKE, GO TO THE NEXT PAGE.

THE SHIP IS A FLOATING COMMUNITY IN WHICH EVERYONE PLAYS AN IMPORTANT ROLE. COME ABOARD AND EXPLORE THREE OF THE MANY DIFFERENT CAREERS THAT CONTRIBUTE TO THE SUCCESS OF THIS PROGRAM. IN THIS "CHOOSE YOUR OWN" ISSUE OF "TALES OF THE RESOLUTION," YOU CAN SELECT WHICH PERSON YOU WANT TO TAG ALONG WITH AS THE CREW CARRIES OUT THEIR RESPONSIBILITIES. YOU'LL GET AN INSIDE LOOK AT WHAT HAPPENS ABOARD THE "JR" AND SEE THAT YOU TOO MAY BE ABLE TO ONE DAY SAIL ON THIS SHIP AND LEARN ALL ABOUT THE HISTORY OF THE EARTH.

WELCOME ABOARD AND ENJOY YOUR TRIP!



AN ACORK IS A TOOL SYSTEM THAT ALLOWS SCIENTISTS TO COLLECT DATA, SUCH AS TEMPERATURE AND PRESSURE, FROM BELOW THE SEA FLOOR FOR MANY YEARS. HERE ARE SOME OF ITS MAIN COMPONENTS:

OCEAN

ACORK WELL HEAD - THIS IS WHERE ADDITIONAL INSTRUMENTS CAN BE INSTALLED IN THE CASED HOLE AFTER THE JOIDES RESOLUTION IS GONE.

ROV PLATFORM - THIS IS WHERE SUBMERSIBLES AND REMOTELY OPERATED VEHICLES (ROVS) LAND TO COLLECT DATA FROM THE DATA RECORDER.

DATA RECORDER - STORES PRESSURE AND TEMPERATURE DATA UNTIL THEY CAN BE DOWNLOADED BY ROV OR SUBMERSIBLE.

RE-ENTRY CONE - HELPS GUIDE THE DRILL STRING AND CASING DURING MULTIPLE "TRIPS" INTO THE HOLE.

SEAFLOOR

CASING - METAL PIPE THAT IS LOWERED INTO THE OCEAN FLOOR TO PREVENT SHALLOW SECTIONS OF THE HOLE FROM COLLAPSING.

HANGER - SETS THE ACORK FLUSH WITH THE SEAFLOOR SO THE SENSORS COLLECT DATA AT THE PROPER DEPTH. THIS PIECE HAS AN IMPORTANT ROLE IN OUR STORY!

HYDRAULIC LIMBILICAL - TRANSMITS PRESSURES FROM THE FORMATION SCREENS TO THE SEAFLOOR DATA RECORDER.

SCREENS - ALLOW WATER BELOW THE SEAFLOOR TO REACH THE SENSORS WHILE PROTECTING THEM FROM SEDIMENT.

SEDIMENTS

MORE SCREENS

CEMENT AND BRIDGE PLUG - SEALS THE BOTTOM OF THE CASING, PREVENTS LEAKAGE, AND ALLOWS ADDITIONAL INSTRUMENTS TO BE ADDED INSIDE OF CASING.

CHOOSE WHO YOU WANT TO FOLLOW ...

SCIENTIST!

HELLO, I'M EARL DAVIS, A GEOPHYSICIST. GEOPHYSICISTS STUDY DIFFERENT ASPECTS OF THE EARTH, SUCH AS ITS COMPOSITION, ITS MAGNETIC AND GRAVITATIONAL FIELDS, AND THE ORIGIN OF VOLCANOS AND ROCKS. MY SPECIFIC INTERESTS ARE EARTHQUAKES AND THE MOTIONS OF EARTH'S TECTONIC PLATES.

I AM HERE TO INSTALL AN ACORK, A LARGE TOOL THAT WILL COLLECT PRESSURE AND TEMPERATURE DATA BELOW THE SEA FLOOR SO THAT WE CAN BETTER UNDERSTAND WHAT IS HAPPENING BEFORE, DURING, AND AFTER AN EARTHQUAKE.

TO JOIN EARL, GO TO PAGE 7

HEY THERE! MY NAME IS JACINTO TABAT. I AM A WELDER.

I HELPED PIECE THIS SHIP TOGETHER WITH MY OWN TWO HANDS. WITH MY TECHNICAL KNOWLEDGE I CAN REPAIR PRETTY MUCH ANYTHING ONBOARD AND MAKE EQUIPMENT THAT ANY SCIENTIST NEEDS.

Welder!

TO JOIN JACINTO, GO TO THE NEXT PAGE

Engineer!

HI, I'M BOB ADUDDLELL.

AS AN ENGINEER, I USE SCIENCE, MATH AND PRACTICAL SKILLS TO DESIGN TOOLS, MACHINERY AND EQUIPMENT FOR A SPECIFIC NEED. I WORK CLOSELY WITH THE SCIENTISTS TO HELP THEM BRING THEIR VISIONS TO LIFE!

TO JOIN BOB, GO TO PAGE 6



THANKS FOR JOINING ME!
LET ME TELL YOU HOW I GOT STARTED
WORKING AS A WELDER: I GREW UP IN THE
PHILIPPINES (CHECK OUT THE MAP BELOW),
AND AS A CHILD, I WORKED VERY HARD TO
PUT MYSELF THROUGH
SCHOOL.

ONCE I WAS OLD
ENOUGH, I BEGAN TRAINING AS A
WELDER, AND EVENTUALLY I EARNED MY
CERTIFICATION. I TRAVELED TO WELDER
SHOPS IN SINGAPORE, SAUDI ARABIA,
LIBYA, AND BULGARIA, WHERE I WORKED
IN MY FIRST SHIPYARD.

NOW I SAIL
ON SHIPS LIKE THE JR AND
HELP SCIENTISTS BY PUTTING
TOGETHER THE TOOLS AND
EQUIPMENT THEY NEED TO
CONDUCT THEIR
RESEARCH.

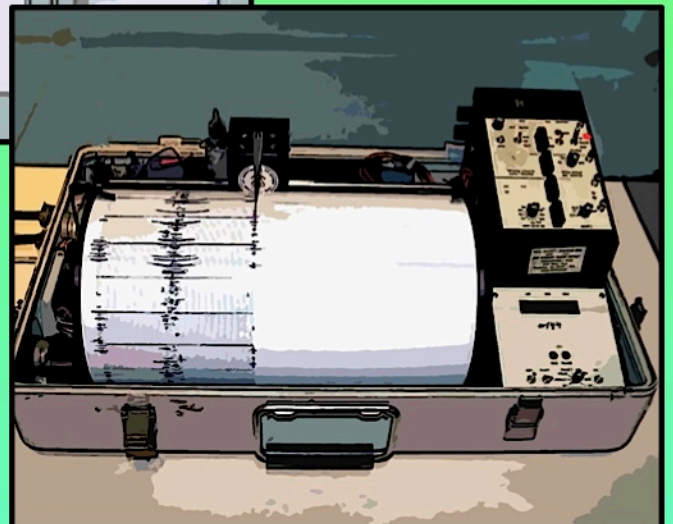
HERE, LET
ME SHOW YOU
EXACTLY WHAT I
DO! FOLLOW ME
TO PAGE 8 ...



THANKS FOR JOINING ME! I RECEIVED MY BACHELORS DEGREE IN MECHANICAL ENGINEERING. I THEN GOT WORK EXPERIENCE MANUFACTURING SCREENS - LIKE THIS VIDEO MONITOR UP HERE - AND ENGINEERING EQUIPMENT, LIKE THE SEISMOGRAPH SHOWN BELOW, WHICH IS USED TO STUDY EARYHQUAKEES. I ALSO DESIGNED ELECTRONIC PACKAGING FOR NASA.



IF YOU COME WITH ME, I'LL SHOW YOU SOME OF MY PROJECTS ABOARD THE JR. FOLLOW ME TO PAGE 10!



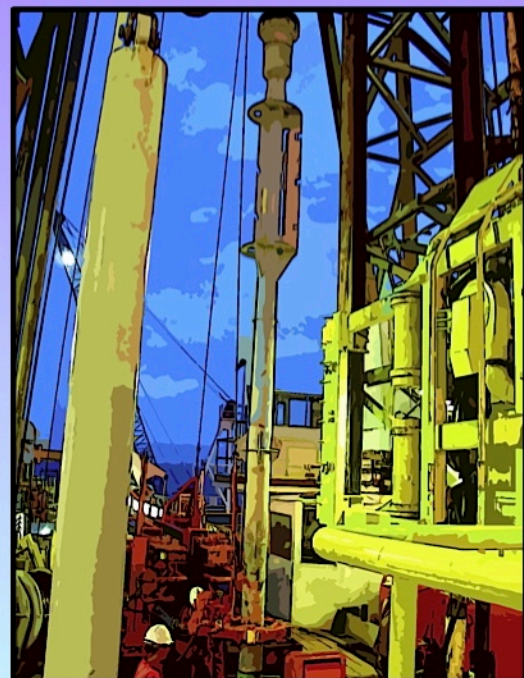
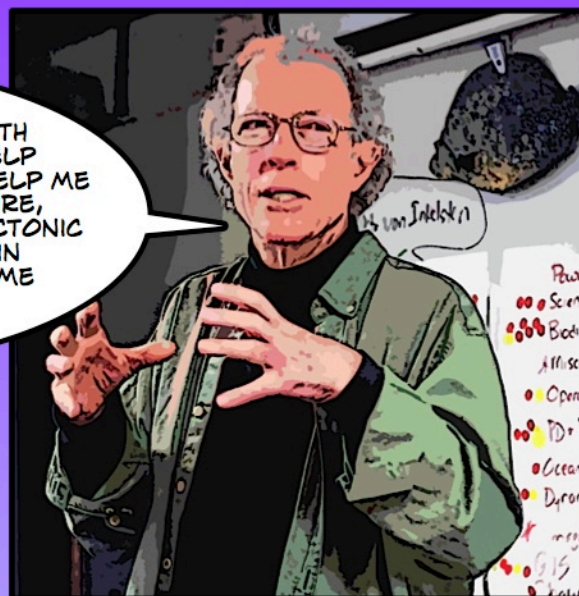


THANKS FOR JOINING ME! FOR MANY YEARS I'VE BEEN STUDYING AND ASKING QUESTIONS ABOUT THE EARTH.

BUT I WASN'T ALWAYS INTERESTED IN EARTH SCIENCE -- IN FACT, I INITIALLY WANTED TO BE AN ARCHITECT! HOWEVER, AFTER GOING TO SCHOOL FOR ARCHITECTURE, I CHANGED MY MIND AND ENDED UP GETTING A BACHELOR'S DEGREE IN PHYSICS. AFTER YEARS OF STUDY, I NARROWED MY FOCUS AND EVENTUALLY GOT A PH.D IN GEOPHYSICS.

NOW, HERE ON THE JR, I AM USING MY KNOWLEDGE OF BOTH SCIENCE AND ARCHITECTURE TO HELP INSTALL AN INSTRUMENT THAT WILL HELP ME STUDY SMALL CHANGES IN PRESSURE, TEMPERATURE, AND STRAIN IN THE TECTONIC PLATES. HAVING A BACKGROUND IN ARCHITECTURE ACTUALLY HELPED ME DESIGN THE INSTRUMENTS I NEED!

SO YOU SEE, IT'S GREAT TO MASTER A SPECIFIC AREA OF STUDY, BUT KNOWLEDGE IN LOTS OF DIFFERENT SUBJECTS CAN ALSO BE REALLY HELPFUL BECAUSE THEY WILL OFTEN APPLY TO ONE ANOTHER. I HOPE YOU'LL GET A CHANCE TO SEE WHAT I MEAN . . . I'LL CATCH YOU ON PAGE 12!



THIS WELDER'S
TORCH SPITS OUT A VERY HOT
FLAME AND HELPS ME HEAT
METAL TO THE POINT WHERE I
CAN SHAPE IT, OR EVEN JOIN
TWO PIECES TOGETHER.



I WELD
EQUIPMENT TO THE SHIP'S
DECK TO KEEP IT STABLE
WHILE MEASUREMENTS ARE
BEING TAKEN. LATER ON, I RE-
HEAT THE METAL TO REMOVE
THE EQUIPMENT WHEN THE
SCIENTISTS ARE DONE
WITH IT.



I REALLY LOVE
MY JOB!



RIGHT NOW
I AM HELPING THE
SCIENTISTS GET READY
TO INSTALL AN ACORK
TOOL DOWN INTO THE
SEA FLOOR.



BUT SAFETY COMES
FIRST! BECAUSE WORKING WITH
EXTREMELY HOT FLAMES AND
METAL CAN BE DANGEROUS, IT'S
ALWAYS IMPORTANT TO WEAR YOUR
SAFETY GOGGLES OR MASK AND
PROTECTIVE GLOVES.



I'LL MEET UP
WITH YOU AGAIN
ON PAGE 17.



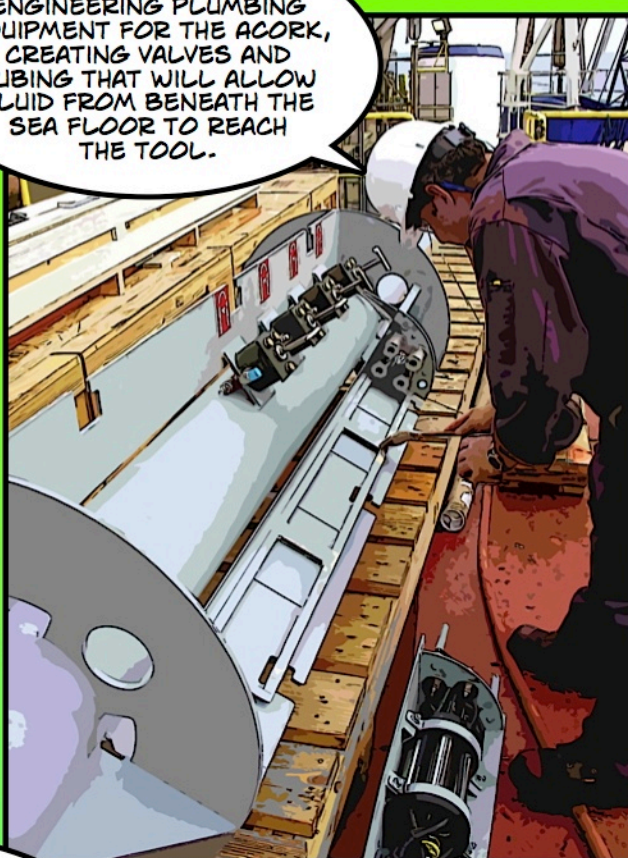


THE DRILLING EQUIPMENT ON THE JOIDES RESOLUTION IS ESSENTIAL FOR THE SCIENTISTS' STUDIES. BUT SOMEONE HAS TO MAKE SURE THAT IT IS ALWAYS FUNCTIONING CORRECTLY. IT'S MY JOB TO MONITOR THE PERFORMANCE OF THE EQUIPMENT AND SEE IF ANY ALTERATIONS OR ADDITIONAL TOOLS ARE NEEDED.





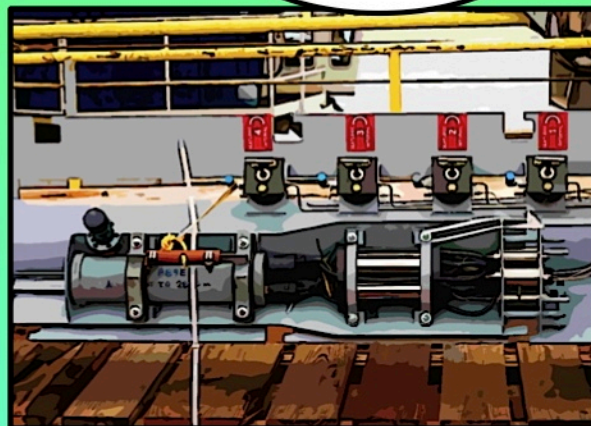
I HAVE BEEN ENGINEERING PLUMBING EQUIPMENT FOR THE ACORK, CREATING VALVES AND TUBING THAT WILL ALLOW FLUID FROM BENEATH THE SEA FLOOR TO REACH THE TOOL.



IT'S IMPORTANT THAT I CHECK THE DIMENSIONS OF THE HANGER ON THE ACORK, BECAUSE THIS IS THE PIECE THAT KEEPS THE SCIENTIFIC INSTRUMENTS IN POSITION.

HMMM.... THESE MEASUREMENTS SEEM A LITTLE BIT OFF. THIS IS NOT GOOD! WE'RE GOING TO NEED TO FIX THIS OR ELSE THE INSTRUMENTS COLLECTING THE DATA WILL NOT BE SITUATED CORRECTLY. I BETTER HEAD ON OVER TO MY OFFICE AND GIVE EARL A CALL!

I'LL CATCH UP WITH YOU AGAIN ON PAGE 14 ...



MEANWHILE, IN THE CO-CHIEF SCIENTISTS' OFFICE ...

BEFORE I GET ON THE SHIP, I WRITE PROPOSALS TO GET THE FUNDS TO INVESTIGATE THE QUESTIONS PEOPLE HAVE ABOUT TECTONIC PLATES.

MY COLLEAGUES AND I MEASURE PRESSURE AND TEMPERATURE IN SEDIMENT AND VOLCANIC ROCKS BELOW THE SEAFLOOR TO SEE WHAT THEY REVEAL ABOUT FLUID FLOW AND PLATE MOVEMENTS.

ON THIS EXPEDITION, WE'RE LOOKING SPECIFICALLY AT WHAT HAPPENS TO THE SOFT OCEAN SEDIMENTS ON TOP OF A HEAVY OCEANIC PLATE WHEN IT COLLIDES WITH A LIGHTER CONTINENTAL PLATE AND PLUNGES BENEATH IT.

THESE TYPES OF PLATE COLLISIONS ARE OF COURSE ONE OF THE WAYS THAT EARTHQUAKES ARE GENERATED.

I SPEND A LOT OF TIME AT THE COMPUTER INTERPRETING THE DATA AND WRITING SCIENTIFIC REPORTS SO WE CAN COMMUNICATE OUR DISCOVERIES.



MY WORK
REQUIRES A TEAM OF
SCIENTISTS, ENGINEERS,
TECHNICIANS, AND
STUDENTS TO DESIGN
AND DEPLOY SCIENTIFIC
INSTRUMENTS.

DATA COLLECTION
IS VERY TIME CONSUMING,
BUT MY BIGGER CHALLENGE
IS COMMUNICATING THE
SCIENCE TO
OTHERS.



EXCUSE ME, I
HAVE TO TAKE
THIS PHONE
CALL ...

RING!!



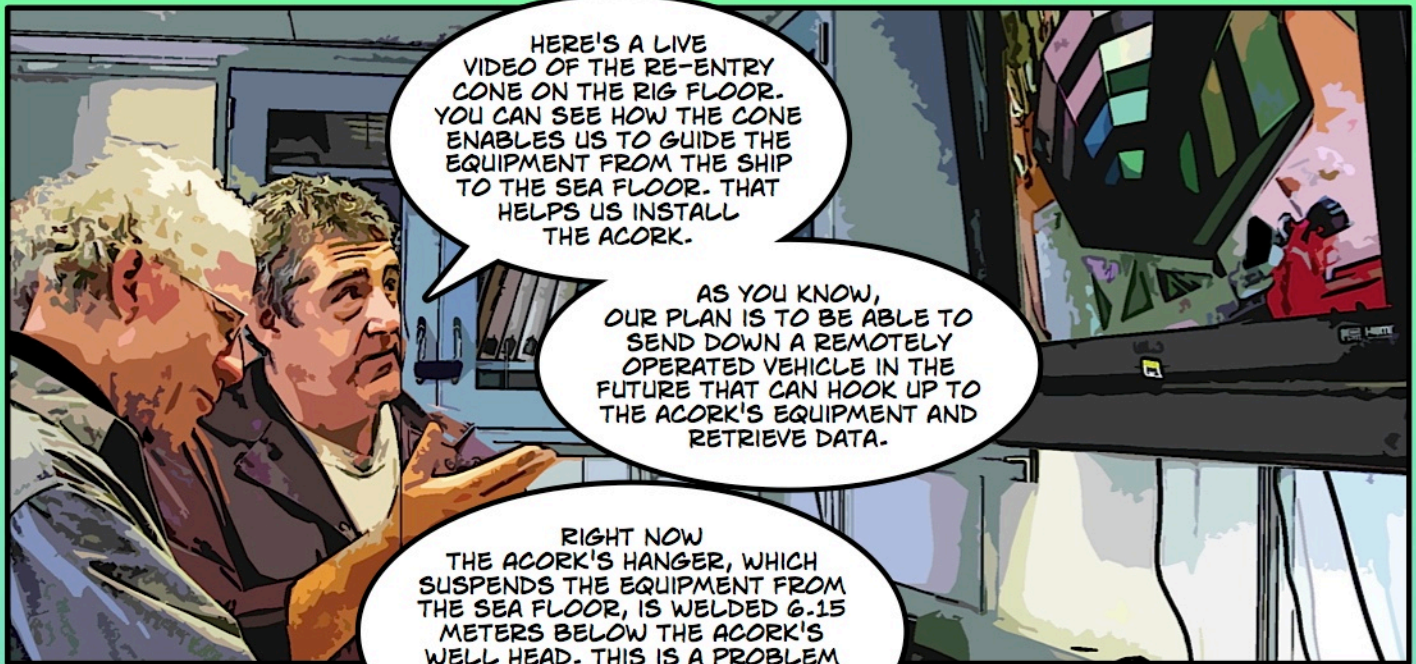
HEY EARL,
YOU GOT A SECOND? I WAS
JUST CHECKING THE DIMENSIONS
OF THE ACORK HANGER AND
SOME OF THE MEASUREMENTS
ARE OFF. I'M BACK IN MY OFFICE
NOW - COULD YOU COME ON UP
HERE AND HAVE A
LOOK?

BOB THE ENGINEER

UH-OH, THAT'S
NOT COOL. IT'S REALLY
IMPORTANT THAT WE GET
ALL THE INSTRUMENTS
IN THE PROPER PLACE
TO COLLECT THE DATA.
I'LL BE RIGHT
THERE.



EARL THE SCIENTIST



HERE'S A LIVE VIDEO OF THE RE-ENTRY CONE ON THE RIG FLOOR. YOU CAN SEE HOW THE CONE ENABLES US TO GUIDE THE EQUIPMENT FROM THE SHIP TO THE SEA FLOOR. THAT HELPS US INSTALL THE ACORK.

AS YOU KNOW, OUR PLAN IS TO BE ABLE TO SEND DOWN A REMOTELY OPERATED VEHICLE IN THE FUTURE THAT CAN HOOK UP TO THE ACORK'S EQUIPMENT AND RETRIEVE DATA.

RIGHT NOW THE ACORK'S HANGER, WHICH SUSPENDS THE EQUIPMENT FROM THE SEA FLOOR, IS WELDED 6.15 METERS BELOW THE ACORK'S WELL HEAD. THIS IS A PROBLEM BECAUSE THE SENSORS WON'T BE AT THE CORRECT DEPTHS.



WE NEED THE ACORK TO REACH A DEPTH OF 323.1 METERS BELOW THE SEA FLOOR, BUT THE WAY THINGS SIT RIGHT NOW, IT WILL ONLY REACH 323 METERS.

GOOD CATCH, AND GREAT WORK! IT'S REALLY IMPORTANT THAT WE GET GOOD DATA, SO I APPRECIATE YOUR HELP ON THIS.

NO PROBLEM. WE JUST NEED TO MOVE THE HANGER UP ON THE ACORK. COME UP ON DECK AND I'LL SHOW YOU.





LIP ON THE RIG FLOOR ...

SAM TO
TABAT! PLEASE
REPORT TO THE
ACORK ASSEMBLY
FLOOR!

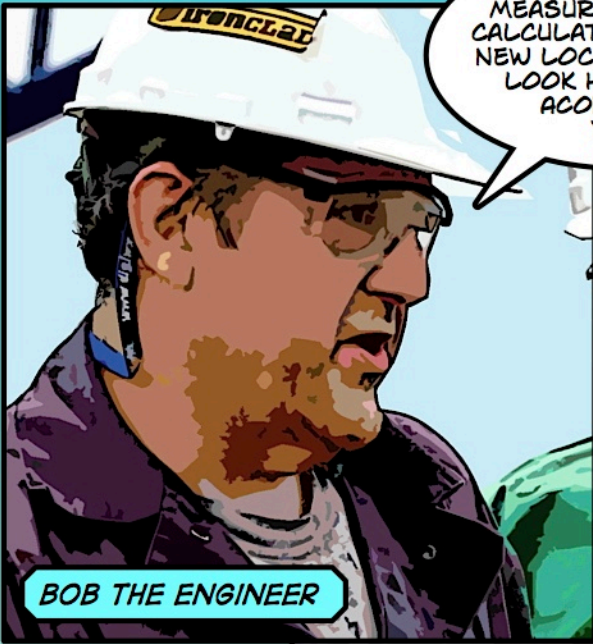
HMM ...
I WONDER
WHAT THIS IS
ABOUT.





TABAT, WE
NEED YOU TO CHANGE
SOME EQUIPMENT IN THE
ACORK. IT LOOKS LIKE
THE HANGERS ARE IN THE
WRONG SPOT.

A close-up of Earl The Scientist, an older man with glasses and a white hard hat, looking slightly to the left. He is wearing a dark jacket with a yellow tag hanging from his neck.




I HAVE THE
MEASUREMENTS AND
CALCULATIONS FOR THE
NEW LOCATION. TAKE A
LOOK HERE AT THE
ACORK, WILL
YOU?

A close-up of Bob The Engineer, a man with a beard and glasses, wearing a white hard hat with a yellow tag that says "Ironclad". He is looking towards the right.

EARL THE SCIENTIST

BOB THE ENGINEER



HMM, OK. SO
AS THINGS STAND NOW THE
HANGER WILL MAKE THE
ACORK REACH 323 METERS
BELOW THE SEA FLOOR, BUT
IT NEEDS TO REACH 323.1
METERS. I'LL JUST REMOVE
THE HANGER AND RE-WELD IT
10 CM UP ALONG
THE ACORK.

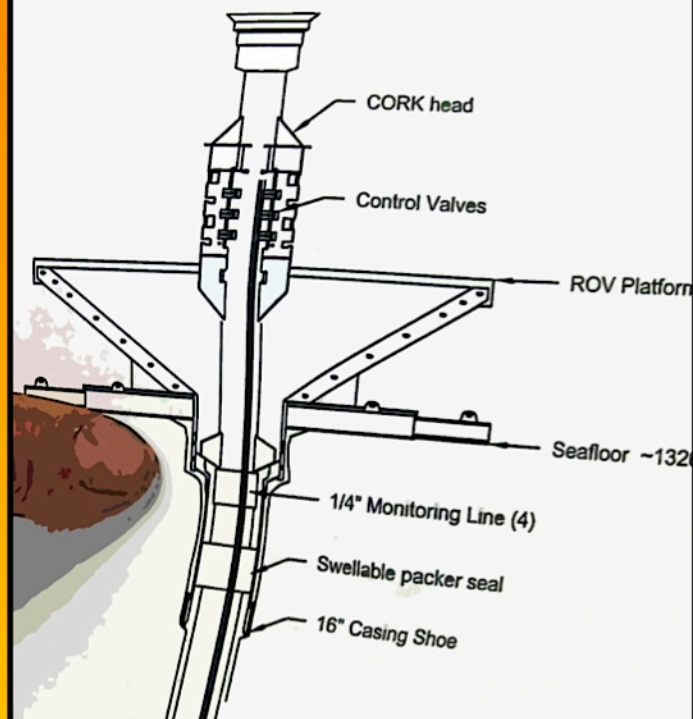
A close-up of Tabat The Welder, a man wearing a red protective suit and a welding mask, working on a large metal structure. He is holding a welding torch.

TABAT THE WELDER

IODP Phase II - CASCA

I'LL HEAT THE METAL 6.05 METERS BELOW THE WELL HEAD TO ATTACH THE HANGER THERE.

EVERYBODY, STAND BACK PLEASE!







NICE WORK,
TABAT! IT LOOKS LIKE
EVERYTHING IS IN ITS
CORRECT PLACE NOW. WE
SHOULD BE READY TO
LOWER THE ACORK INTO
THE SEA FLOOR.





EVEN THOUGH OUR EXPEDITION TO INSTALL THE ACORK IS NOW OVER, THE SCIENCE WILL CONTINUE. THE ACORK WILL STAY ON THE OCEAN FLOOR COLLECTING DATA FOR 20 YEARS OR MORE. INITIALLY, DATA WILL BE COLLECTED BY ROV. AFTER THAT, THE INSTRUMENTS WILL BE PLUGGED INTO A FIBER-OPTIC CABLE, ALLOWING DATA TO BE RECEIVED IN OUR OFFICES IN REAL TIME. PRETTY EXCITING, ISN'T IT?

THANKS FOR FOLLOWING ME AS I PURSUE MY EXCITING AND REWARDING CAREER. AS YOU SAW, I GET TO BUILD, MODIFY AND REPAIR THINGS ON MANY PROJECTS INVOLVING SCIENCE AND TECHNOLOGY. GOOD LUCK IN YOUR CAREER - WHICHEVER ONE YOU CHOOSE!



I AM GLAD YOU HAD THE CHANCE TO SEE TEAMWORK AND PROBLEM SOLVING IN ACTION. EVERY JOB OUT HERE USES THESE SKILLS. WHATEVER CAREER YOU CHOOSE, MANY CHALLENGES WILL COME YOUR WAY, AND IT'S IMPORTANT TO LEARN HOW TO HANDLE AND REACT TO DIFFERENT SITUATIONS. YOU LEARN AS YOU GO!

LINKS OF INTEREST:

[HTTP://JOIDESRESOLUTION.ORG/NODE/904](http://JOIDESRESOLUTION.ORG/NODE/904)

[HTTP://MARINECAREERS.NET](http://MARINECAREERS.NET)

[HTTP://MARINEBIO.ORG](http://MARINEBIO.ORG)

[HTTP://CAREERS-AT-SEA.ORG](http://CAREERS-AT-SEA.ORG)

[HTTP://MAPYOURCAREER.ORG](http://MAPYOURCAREER.ORG)



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EXPEDITION 328 STAFF AND SCHOOL OF ROCK EDUCATORS!

*FOLLOW THE "TALES OF THE RESOLUTION" AT:
WWW.LDEO.COLUMBIA.EDU/BRG/TALES*