Drilling & Fishing Jars 101

From the delivery truck to the return ticket



Original illustrative cover image. It does not depict a specific jar model.

Field learning manual

A practical companion to the immersive course and instructor presentation. Learn the tool families, understand the energy path, prepare the job with the vendor, observe tool behavior, and return useful evidence to the service shop.

Course use

Foundation learning supports supervised field discussion. Actual operation requires the correct tool identity, current manufacturer instructions, vendor confirmation, an approved well program and competent supervision. Loads, pump conditions, latch or clamp actions, timing and reset procedures belong to the actual model and job. A knowledge check does not certify operating competence.

Prepared for Travelin' Matt's Energy Learning Series. Sources and historical reference conflicts are documented in the final appendix.

Learning routes

Use the full course for a structured class, then carry the worksheets into the vendor and crew discussion. Revisit a specific module when the delivered tool, well conditions or operating plan changes.

Module	Learning focus
01	The job from delivery to return
02	The family of impact tools
03	A mental model of the jar
04	Receiving and accepting the tool
05	Handling and stored energy
06	Planning the complete assembly
07	Loads, pressure and what the driller sees
08	Prejob briefing and rig preparation
09	Running, drilling and tripping
10	A sticking event and the first decisions
11	Executing the approved jarring program
12	Troubleshooting without guessing
13	Recovery, inspection and vendor return
14	Practice, teachback and the next level

Suggested teaching format

Allow 90 to 120 minutes for a facilitated foundation class, including scenarios, questions and worksheet review. That duration is a teaching suggestion, not an operating requirement. Use the short narrated lesson as an introduction. Follow classroom learning with a vendor led identification and handling walkthrough on a secured tool. Never create a live jarring demonstration solely to satisfy this course.

MODULE 01

The job from delivery to return

A jar is part of a planned recovery system. Its identity, condition and operating instructions travel with it.

What this course enables

Use this course to recognize the tool, explain its purpose, prepare the right questions, follow the approved well program and make a useful handover to the next crew. The learning path follows a rental tool through the gate, onto the racks, into the string, through an operating event and back to its service center. Each stage creates information that the next stage needs. A serial number missing at receipt can become the wrong specification at the driller's console. A missing jarring log can become an unexplained service failure after return.

This is foundation education for drilling and fishing crews, supervisors, engineers and service personnel. Actual use requires the current instructions for the exact tool, the vendor's service release, the approved BHA and the operator's well control and operating procedures. Completing the course develops understanding. It does not certify someone to operate, rebuild or test a jar.

Evidence: U1, U2, U3, MR01. See source register.

The tool creates an impact

A jar allows controlled relative movement inside a tubular assembly so that a moving hammer meets an anvil. The running string and, where fitted, an energizer provide stored energy. The release mechanism determines when that energy can accelerate the moving mass. The impact then enters the connected string and fish. This explains why pulling harder at surface does not by itself describe the impact delivered downhole.

A drilling jar usually travels in the drilling assembly as a contingency against sticking. A fishing jar becomes part of a deliberately designed recovery assembly. The same word, jar, can describe tools with different release mechanisms, allowable directions and surface handling arrangements. Start every job by naming the exact tool rather than relying on its color, silhouette or rental description. The first useful crew question is: which model and serial number are we actually running?

Evidence: U1, U3, MR01. See source register.

Six handovers that matter

Assign an accountable person at each handover. The receiving crew accepts identity and physical condition. The supervisor accepts the operating documents and job limits. The assembly crew records the installed configuration. The driller receives a readable, approved operating sheet. Each relief crew receives the current tool state and event history. The returning crew gives the vendor an honest condition and exposure record.

Treat questions, mismatches and abnormal observations as work items with named owners. A useful handover says what is known, what remains unresolved and what must happen before the tool moves to the next stage. The tool can be physically on location while still awaiting technical acceptance.

- Receive and identify the actual serialized tool.
- Confirm the approved assembly and operating envelope.
- Brief, run, observe and record.
- Recover, preserve and return with the run history.

Evidence: U1, U2, U3, MR01. See source register.

MODULE 02

The family of impact tools

Mechanism and purpose define the tool. Similar names do not make operating procedures interchangeable.

Drilling jars and fishing jars

Drilling jars must fit the intended drilling environment as well as the possible recovery event. Their planned location, fatigue exposure, torque transmission, temperature capability and interaction with other BHA components matter throughout the run. Fishing jars operate as part of a recovery system whose components must transmit the desired force and retain a way to release from the fish if recovery fails.

Some jars act upward, some downward and some in both directions. Double acting means that the specified tool can produce impacts in both directions. It does not mean the upward and downward loading or reset procedures are identical. The supplied historical drilling jar training describes a double acting hydraulic drilling jar. The supplied historical straight pull fishing jar handbook describes a straight pull tool used for upward jarring. Those examples explain why a generic instruction to slack off and jar down can be wrong for the tool in front of the crew.

Evidence: U1, U2, U3, MR01, MR02, MR04, MR10, MR11, MR12, MR13, MR16. See source register.

Hydraulic, mechanical and combined mechanisms

A hydraulic metering mechanism delays release while load builds in the system. Once the mechanism reaches its release portion of travel, the moving section can accelerate and strike. Temperature, applied load, condition and the particular metering design can change the observed delay. A mechanical release uses a latch or other arrangement associated with a release load or setting. Some commercial designs combine hydraulic and mechanical features.

Ask how the actual tool releases, what makes it reset, whether its setting can change at location and who may make that change. Keep the answer attached to the exact model. The appearance of a slow or quick response alone does not positively identify the mechanism. A training animation can explain load, release, impact and reset, but its timing and travel are illustrative.

This release discussion applies to trip or metering designs. Some simple slickline mechanical jars provide free sliding travel without such a trip mechanism. Identify that distinction before using the four phase teaching model.

Evidence: U1, U3, MR02. See source register.

Energizers, bumper subs and shock tools

An energizer, accelerator or intensifier stores additional recoverable energy in a compatible jarring assembly. Its mechanism may use springs or compressible fluid. Its location and the moving mass between it and the jar require vendor design. More components do not automatically create a better assembly. A bumper sub supplies a different form of axial travel or bumping function according to its design. A shock tool primarily moderates drilling vibration rather than serving as the crew's recovery jar.

Use the correct term in the tally and the briefing. A component described casually as a jar booster still needs its own serial number, limits, service status and operating instructions. The supplied historical drilling jar material describes a spring energizer and a shock tool. Those descriptions support understanding their different purposes, not substituting one tool for the other.

Tool	Primary educational distinction	Question before use
Drilling jar	Recovery capability within the drilling assembly	What drilling exposure and placement are approved?
Fishing jar	Impact tool within a recovery assembly	Which direction and release method are available?
Energizer	Additional stored energy in a compatible system	Which jar, mass and spacing are approved?
Bumper sub	Axial travel or bumping function	What function does this model provide?
Shock tool	Vibration moderation during drilling	What stabilization and operating range apply?

Evidence: U1, U3, MR01, MR02, MR04, MR10, MR11, MR12, MR13, MR16. See source register.

Conveyance changes the task

Drillpipe, workstrings, coiled tubing and wireline do not transmit force in the same way. A wireline hydraulic jar can provide an upward impact where line and stem behavior make a simple mechanical blow less effective. A slickline mechanical jar may be a sliding link or tubular arrangement rather than a preset trip mechanism. Do not assume that every use of the word mechanical means the same release system.

Coiled tubing introduces its own axial load transmission, buckling, pressure control and tool string constraints. A jar selected for that conveyance needs the appropriate operating package and compatible accessories. This foundation course explains the shared concepts. It does not convert drillpipe instructions into wireline or coiled tubing procedures. Identify conveyance alongside model and direction before selecting a training or operating instruction.

Evidence: MR02, MR14, MR16, MR17. See source register.

Two useful current model contrasts

NOV describes an internal latch on its Griffith hydraulic/mechanical drilling jar that removes the need for an external safety collar. That design example demonstrates why an external clamp instruction cannot be universal. SLB's Hydra Jar AP operating sheet prohibits firing with applied or trapped torque. A tool's ability to transmit drilling torque therefore does not establish permission to jar under torque.

These are comparison examples from manufacturer material retrieved for this edition. They do not approve a delivered rental tool for service. Use the current serialized package to confirm configuration and the instructions that apply on the actual job.

Evidence: MR04, MR05. See source register.

MODULE 03

A mental model of the jar

Follow the energy and the moving parts before studying a model's operating sheet.

The parts to recognize

A conceptual jar contains a body, a moving mandrel, a torque transmission arrangement, a release or metering section, and striking surfaces commonly called hammer and anvil. Seals and fluid chambers support the hydraulic function where fitted. The body connections and service joints hold that engineered system together. Their locations are not permission to break the tool apart on the rig floor.

Identify the approved handling areas and the polished mandrel surface using the vendor drawing. The surface that seals while the jar strokes must avoid damage during lifting, tonging and storage. A mark that looks cosmetic can matter if it crosses a sealing or bearing surface. Use a genuine drawing of the actual model for dimensional work. Our simplified cycle graphic illustrates an idea and cannot identify internal parts, lifting points, tong zones or service breaks.

Evidence: U1, U2, U3, MR01, MR09. See source register.

Load, release, impact, reset

For jars with a trip or metering release mechanism, the following phases form a useful conceptual model. Simple free travel slickline jars require a different explanation.

In the loading phase, the running system stores elastic energy while the jar's release mechanism restrains movement. During release, the tool permits faster relative movement. During impact, the hammer and anvil meet and transmit a short duration force into the assembly. During reset, the crew returns the mechanism to the state required for another authorized cycle.

These phases are a memory aid, not a four command operating procedure. A tool may start fully extended or closed, may include a latch, and may require a specific loading history. The upward and downward sequences can differ. The driller must know the current state before initiating another cycle. A change in indicated hook load can be consistent with a release, but interpretation still requires the planned movement, measured travel and overall well response.

Evidence: U1, U2, U3, MR02. See source register.

Impact and impulse answer different questions

Impact force describes force during the collision. Impulse describes force accumulated over the event's duration. The elementary relation for a changing force is the integral of force over time. A simple constant force illustration uses force multiplied by duration. Neither concept supplies a universal multiplier from surface overpull to fish load.

The mass that can accelerate, available stretch, friction, tool stroke, energizer behavior and contact conditions all affect the result. This is why an engineering placement model reports more than one result and why the crew should not chase a larger surface number as proof of a better downhole blow. Record the inputs and observations that allow the vendor or engineer to explain what the system actually did.

Evidence: U1, MR01, MR09. See source register.

MODULE 04

Receiving and accepting the tool

The receiving inspection protects both the well program and the crew that will handle the jar.

A deliberate receipt inspection

Place the shipment in a controlled receiving area with suitable support and access. Match the delivery ticket against the planned tool and any energizer, lifting accessory, clamp, thread protector and documentation. Read the manufacturer, model, series and serial number directly from the tool or its verified identification. Photograph identification and any damage before cleaning or moving the tool unnecessarily.

Walk around the supported assembly. Look for transit damage, bent or missing accessories, loose protectors, corrosion, leakage, damaged threads and damage to exposed moving or sealing surfaces. Record what you can see without opening ports or disturbing service joints. Check that transport restraints and the vendor’s required safe state agree with the supplied instructions. If the identity, restraint state or condition is uncertain, tag the tool and contact the supervisor and vendor. Physical arrival does not equal permission to run.

Evidence: U2, U3, MR06. See source register.

The document package

Request the current model operating instructions, specification sheet, service release or test record required by the contract, serialized configuration details and handling instructions. Confirm any high temperature configuration, special seals, connection option or restricted service exposure against the actual tool. A familiar series name does not establish that every rental tool has the same internals or service limit.

Keep the approved documents available where the driller and supervisor can use them. Include the vendor’s current support contact and a method to reach technical support outside office hours. Historical brochures and this course help the crew understand the questions. The current model instructions and service documentation define the issued tool package. The approved job envelope also includes the complete assembly and well program. A missing page of an operating guide can be more significant than a missing spare protector.

Evidence: U2, U4, MR06. See source register.

Acceptance record

Use a receiving record that can follow the tool through its complete run. Write units beside every dimension and load. If the shipment substitutes another model or connection, recheck the engineering and operating plan before accepting the substitution. Keep an unresolved item visible until the responsible person closes it.

Record field	Evidence to retain
Identity	Manufacturer, exact model, series, serial number and vendor ticket
Configuration	OD, ID, connection ends, direction capability and accessories
Service status	Issued release, test documentation and applicable service restrictions
Physical condition	Photos, leaks, thread or mandrel damage and transit concerns
Documents	Revision, issue date, support contact and receipt reviewer
Disposition	Accepted, held or rejected, with reason and responsible person

Evidence: U2, U3, U4, MR06. See source register.

MODULE 05

Handling and stored energy

A jar can move abruptly when its load or restraint changes. Handling plans must account for that movement.

The movement envelope

Treat a jar as a tool with potential relative travel. Before lifting, confirm the vendor's prescribed transport or handling state and how that state will remain controlled during the lift. Identify the full travel and pinch zones for the actual model. Plan where hands, feet, rigging and nearby equipment will be throughout the move. A person guiding the tool should never have to place a hand where the mandrel could close.

Use a lift plan, suitable rated equipment and authorized lifting points or subs. Verify the lifting accessory's identity, connection and make up requirements. Support a long assembly to prevent rolling or unintended bending. Keep people clear of suspended loads and the possible path of tool movement. Changing from horizontal support to a suspended position can change which parts carry weight and therefore change the risk.

Evidence: U2, U3, MR03, MR04, MR09, MR11. See source register.

Safety clamp and latch differences

Some jars use an external safety clamp or collar during handling. Others use an internal latch or a different restraint arrangement. Confirm the exact requirement from the model instructions and the vendor's release package. Decide who will remove, retain and reinstall any external restraint and at what approved stage. Record the change as a crew handover item.

For the supplied historical drilling jar guide, the safety clamp has a specific role before running and again during return to the rig floor. That is a model example, not a universal clamp sequence. A clamp left installed when it should be removed can defeat function or create another problem. A clamp removed before the tool reaches its controlled handling condition can expose the crew to travel. Neither action should depend on someone's memory of a different jar.

Evidence: U2, U1, MR03, MR04, MR09, MR11. See source register.

The suspended tool lesson

The historical straight pull fishing jar handbook warns that a closed tool suspended in elevators with weight below it can open through its stroke. Use that warning to ask the right handling question for every jar: what can move if this weight transfers? Confirm the safe suspended and supported arrangements for the actual model before the lift starts.

Keep tongs, slips, chains and slings away from the polished mandrel where the applicable instructions prohibit contact. Protect the mandrel and threads when placing the tool on racks. Do not remove fill plugs, bleed fittings or internal connections to investigate a concern at location unless an authorized service procedure and qualified personnel specifically cover that work. The rig crew’s normal task is to preserve, isolate and report the condition.

Evidence: U2, U3, MR03, MR04, MR09, MR11. See source register.

MODULE 06

Planning the complete assembly

Jar placement and operating limits belong to the complete string, well geometry and recovery objective.

The planning inputs

Give the vendor or responsible engineer a current tally and well description. Include component lengths, weights, diameters, connection details and location in the string. Provide the planned depth interval, inclination and dogleg information, fluid system and density, temperature, flow conditions, expected weight on bit and relevant downhole restrictions. For fishing, add the fish description, engagement method, likely stuck interval and release contingency.

Explain what the jar must accomplish and what the surrounding components can tolerate. A planned impact direction, a limited pull on the fish and a sensitive component in the string can create competing requirements. Resolve them during design. A placement recommendation from a previous well is a starting reference only. Changing the motor, collars, fluid, hole geometry or fish can change the system enough to require a new review.

Evidence: U1, U2, U3, MR05, MR08, MR10. See source register.

Neutral point, mass and placement

The neutral point is the location where axial force crosses zero between tension and compression under the stated operating condition. The surrounding transition zone describes the nearby change in loading state. Its location depends on the string, buoyancy, weight on bit, friction and geometry. It can move as operating conditions change. The jar's position relative to that region affects its working state and exposure. Use the vendor's placement method and the actual operating cases rather than a single generic spacing rule.

Mass above the jar contributes to the moving system during an impact. An energizer's position and the mass between components also matter. Avoid treating the jar as a convenient diameter crossover without design approval. The supplied historical drilling jar material gives particular placement restrictions near transitions and larger OD tools. Keep those attached to that model. Ask the vendor to mark the approved location directly on the issued BHA drawing.

Evidence: U1, U2, MR05, MR08, MR10. See source register.

The complete system limit

A jar's tensile yield value is not an operating target. An overpull limit is not the same as total hook load. A connection's make up torque is not the same as torque permitted during jarring. A rotating dogleg limit may differ from a sliding limit. Read the headings and conditions as carefully as the number.

The approved envelope must account for the jar, energizer, pipe, connections, fish engagement, rig and other exposed components. The governing limit is the applicable weakest permitted element under the combined loads and current condition. Do not choose a maximum from one table and assume the rest of the system can accept it. Keep rated strength, allowable working load, preimpact load and calculated dynamic response distinct in every briefing and log.

Evidence: U1, U2, U3, U4, MR05, MR08, MR10. See source register.

MODULE 07

Loads, pressure and what the driller sees

Surface readings are observations of the whole system. They need a model and context to describe load at the jar.

Hook load, overpull and buoyancy

The weight indicator measures a surface response. The desired load at a jar depends on the reference condition, weight distribution, fluid buoyancy, friction and the part of the assembly that is stuck. Before use, the responsible engineer and driller need an agreed reference reading and the method for translating the approved jar load into a surface target.

Air weight and submerged effective weight are different quantities. A deeper or more deviated well can also have significant friction and changing contact conditions. A surface movement may first change pipe stretch or overcome drag before the intended action reaches the jar. Use the issued calculation and verify its assumptions against the actual tally and well conditions. This course deliberately provides no universal hook load worksheet with prefilled numbers.

Evidence: U1, U2, U3, MR06, MR07. See source register.

Pump open force

Pressure difference acting across a tool's effective area can create a net axial force. In many jar discussions this is called pump open force. The relevant differential and effective area are model specific. Standpipe pressure alone is not automatically the required differential across the jar's operating area. The effect can change loading and resetting behavior.

For a classroom dimensional relationship, pressure multiplied by area has units of force. That relation cannot replace the vendor's pressure balance model or the well's hydraulic calculation. The supplied historical drilling jar guide discusses pump open effects on its operation. Any change to pump conditions must still follow the approved well control, hydraulics and operating plan. The course does not direct a crew to stop pumping when a jar does not respond.

Evidence: U1, U2, MR06, MR07. See source register.

A useful operating sheet

The driller's issued sheet should show the intended direction, reference conditions, approved surface targets, relevant limits, pump state, torque restrictions, model reset requirements, expected response and stop criteria. Each value needs units and a definition. Identify who approved the sheet and when it must be revised.

Include what to do when actual drag, pump conditions or tool behavior differs from the assumptions. A clear escalation path prevents the crew from improvising a new limit under pressure. Keep changes legible and communicated to every person who operates the controls. Old values should remain in the job record as superseded history rather than remaining beside current targets without explanation.

- Reference condition and verified instrument status.
- Approved direction, load basis, pump condition and torque rule.
- Model reset and release instructions with the correct revision.
- Observation log, review interval and escalation authority.

Evidence: U1, U2, U3, MR06, MR07. See source register.

MODULE 08

Prejob briefing and rig preparation

Prepare the people and the assembly before the tool reaches a point where a mistake is difficult to recover.

The crew briefing

Walk the crew through the expected job and the possible recovery event. Name the person directing the operation, the person at the controls, the observer recording data and the person communicating with vendor support. Explain the tool's possible movement, the exclusion zones and the signal that stops work. Use a drawing or the supported tool to identify the approved handling and tong areas.

Ask the driller and relief crew to explain the intended jar state during running, drilling, activation and return. Review the current operating sheet and the limits that must not be exceeded. Include well control, pressure and torque restrictions, the release contingency for a fishing assembly and the plan if the jar fails to respond. A brief teachback is stronger evidence of understanding than asking whether everyone has seen jars before.

Evidence: U1, U2, U3, MR03, MR05. See source register.

Assembly at the rig floor

Match each component against the approved tally before make up. Confirm orientation, connection compatibility, thread condition, compound and the specified connection make up practice. Verify the lifting sub and any crossover. Use the vendor's marked tong areas and avoid transferring make up torque through internal service joints.

The supplied historical drilling jar guide specifies box end up and tong placement near its end connections, while the historical fishing jar handbook describes a different tong exclusion near its joints. This difference is exactly why a generic distance or orientation should never become a universal instruction. Put the applicable drawing where the tong crew can see it. If the rig cannot handle the assembly within those instructions, stop and resolve the handling method before proceeding.

Evidence: U2, U3, MR03, MR05. See source register.

The release to run check

Before the assembly crosses the rotary, confirm that the physical configuration, documented configuration and approved program agree. Check the restraint or latch state against the model instructions. Account for external clamps and accessories so that the correct items travel downhole and the retained items remain available for return. Verify the operating sheet and contact method at the driller's station.

Record the release to run with the serial numbers and reviewer. This is also the moment to resolve a missing test record, unexplained leak or changed BHA. Do not bury an unresolved issue in a general checklist completion mark. The release record should make the decision understandable to someone who was not present.

- Correct serialized tool and compatible accessories.
- Accepted condition, documents and approved BHA position.
- Correct orientation, end make up and restraint state.
- Crew brief complete and operating sheet available.

Evidence: U1, U2, U3, MR03, MR05. See source register.

MODULE 09

Running, drilling and tripping

Normal operations can change jar loading. Crew awareness continues throughout the run.

Running in and drilling

Follow the issued program for running speed, movement, pumping and restrictions. Keep the jar's planned state in mind while weight transfers through the assembly. Record the installed depth and configuration so that later decisions use what actually went in the hole. Changes made after the initial design need review rather than an assumption that they are too small to matter.

During drilling, observe abnormal vibration, torque, drag, pressure or weight behavior through the normal rig monitoring process. These observations do not prove a jar fault. They are context for the tool's operating exposure and for any later sticking event. Maintain the time and temperature record required by the vendor's service restrictions. A jar that never intentionally fires can still accumulate service exposure during drilling.

Evidence: U1, U2, U4, MR05. See source register.

Tripping and changing load state

A jar's load state can change while picking up, slacking off, setting slips or moving through the neutral region. The applicable model instructions may require a particular transition or waiting condition before tripping or setting down. Review those steps before the trip starts, especially when the jar has operated in compression or has recently fired.

Avoid surprise by telling the next crew what state the tool should be in and what movements could change it. A quiet tool is not proof that it is safely latched, reset or fully bled through its mechanism. The required evidence comes from the model procedure and the observed operation. Do not infer readiness from elapsed time alone.

Evidence: U2, U3, MR05. See source register.

The shift handover

Give the incoming driller the serial number, model, depth, BHA position, current operating sheet and the most recent observations. State whether jarring has occurred, in which direction, how the tool responded and whether any limit or abnormal condition triggered review. Describe the pump and torque conditions used rather than writing only jarred pipe.

If the crew has changed a planned value with authorized review, identify the current value and the person who approved it. Keep the prior values in the record as history. A useful handover is short enough to read and specific enough to prevent a repeated mistake.

Handover item	What the next driller needs
Current state	Depth, activity, intended jar state and any uncertainty
Operating authority	Current sheet revision and approving person
Run exposure	Hours, temperature information and relevant events
Jarring history	Direction, targets, observed response and review decisions
Outstanding work	Vendor questions, holds and the next review point

Evidence: U1, U2, U3, MR05. See source register.

MODULE 10

A sticking event and the first decisions

The crew needs a diagnosis and an approved objective before selecting a jarring direction.

What to capture first

Follow the operator's stuck pipe and well control procedures. Notify the responsible supervisor and establish a coordinated command of the controls. Capture the time, depth and activity at the event. Record the last normal movement, whether the string was going in or out, available movement and rotation, circulation behavior, pressure changes and recent hole conditions.

Several mechanisms can produce restricted movement. The supplied training describes differential sticking, keyseating, cuttings accumulation and instability. A history that suggests one mechanism does not prove it. Preserve the observations that allow the team to compare explanations. In particular, a pressure change and restricted movement can raise questions that affect the safe circulation response, while an engagement with a fish introduces its own load and release considerations.

Evidence: U1, U3, MR01. See source register.

Direction follows the recovery objective

A familiar rule says to move back against the direction that led into a restriction. That can be a useful discussion prompt for some mechanical sticking situations, but it is not an automatic operating command. The actual mechanism, the tool's available direction, the fish engagement, well conditions and the approved recovery plan determine the action.

Ask what movement the team intends to create at the stuck interval and whether the assembly can transmit it. A jar designed only for an upward blow cannot acquire a downward jarring function because the crew wants one. Some conditions require a different response before jarring, or a different assembly altogether. Document the chosen direction and its reasoning so the crew can review the result against an explicit objective.

Evidence: U1, U3, MR01. See source register.

The first cycle has a plan

Before activation, reconcile the actual depth, fluid and string configuration with the issued calculation. Confirm the model procedure, current limits, approved pump and torque conditions, observation method and review point. Clear the movement envelope and confirm communication with everyone whose equipment can be affected.

Agree what evidence will count as a normal release, a successful movement or an abnormal event. Set an authorized point to pause and review if progress does not occur. Repeated cycles without new information can consume time and service life while the underlying assumption remains wrong. The purpose of the first controlled cycle is both to apply the approved action and to learn how the system responds.

Evidence: U1, U2, U3, MR01. See source register.

MODULE 11

Executing the approved jarring program

This module explains the operating logic. The serialized model procedure supplies the actual commands and settings.

Upward jarring logic

Confirm that upward jarring is available and approved for the actual assembly. Establish the model's required starting and reset state. Use the approved surface target based on the agreed reference and load model. Apply the model's loading method while maintaining the approved pump and torque conditions. Observe the release and the well response from the designated control position.

After the blow, assess whether the planned movement occurred and whether the response stayed within the approved envelope. If another cycle is authorized, complete the model's reset before reloading. Record the measured observations rather than assuming the jar reset because the block moved. These are decision stages for understanding the work. The course supplies no generic overpull, waiting time, stroke speed or number of blows.

Evidence: U1, U2, U3, MR05, MR09. See source register.

Downward jarring logic

Confirm that the tool can produce a downward blow and that the recovery plan calls for it. Check that the available weight and string geometry can create the required load at the jar without unacceptable compression, buckling or other system exposure. Use the actual model's starting state, reset method and approved surface target. Keep the pump and torque conditions within the issued program.

Observe whether the intended release and movement occur. Reassess the state before another cycle or before returning to normal drilling or tripping. The supplied historical drilling jar operating guide contains a contradictory direction word in its downward paragraph. This course intentionally does not turn that paragraph into an operating recipe. Obtain a corrected, current vendor instruction for the serialized tool before executing the job.

Review the whole BHA's compatibility with the provider. Some shock tools below a jar can attenuate a downward blow. Direction capability alone does not establish effective downward action at the intended interval.

Evidence: U1, U2, MR05. See source register.

Torque, timing and repeat cycles

Torque permission varies by model. The supplied historical drilling jar material discusses an allowed jarring torque envelope, while other manufacturers can prohibit torque during their jarring cycle. Never transfer the permission from one jar family to another. The same discipline applies to any instruction to release trapped torque, cool a tool or change circulation.

Delay also varies. The supplied historical training slides and operating guide describe different time ranges, and the guide notes that conditions can extend the delay. Time by itself is therefore a weak reason to add load. Use the approved troubleshooting and escalation path. Record cycle time as an observation, including how the crew measured it, rather than presenting it as an instrument reading of internal jar condition.

Evidence: U1, U2, MR05, MR09. See source register.

MODULE 12

Troubleshooting without guessing

An unexpected response is information. Keep the system inside its approved envelope while the team interprets it.

No release or an unclear release

Pause at the planned review point and confirm the observations. Was the correct model procedure available? Did the tool reach its required starting state? Did the agreed reference load, pump condition and actual drag match the calculation? Could surface movement have changed stretch or friction without completing the intended downhole action? Was the observation method sufficient to distinguish a release from another movement?

These questions organize a vendor discussion. They do not authorize a larger load or a new pump condition. Give support the serial number, current depth, BHA, fluid, temperature information, target and measured values, movement history and time record. A statement that the jar does not work is less useful than a sequence of recorded conditions.

Evidence: U1, U2, U3, MR09. See source register.

A weak, different or changing blow

The response can change because the assembly, friction or stuck condition changes, because the jar did not fully reset, or because the tool requires service. A large surface indication does not necessarily mean a large force reached the intended interval. Compare the observed response with the intended objective and the approved calculation, then request technical review when they diverge.

Stop and escalate for unexpected tool movement, suspected damage, loss of containment, an exceeded limit, unexplained behavior or a change that invalidates the plan. Continue well monitoring and follow the applicable well control and emergency procedures. Preserve the record even when the string frees. A successful recovery does not erase a potentially significant tool exposure.

Evidence: U1, U2, U3, MR09. See source register.

A structured support call

Use one person to state the facts and one person to record the advice. Read back any authorized change before applying it and attach the revised instruction to the job record. If support requests more information, distinguish measured values from estimates and unknowns. Never fill a blank with a plausible number merely to complete a calculation.

Support question	Useful evidence
Which tool?	Manufacturer, model, serial, service ticket and document revision
Where and how installed?	Actual tally, depth, geometry, fish and engagement
What was commanded?	Direction, reference, approved target, pump and torque conditions
What happened?	Time, movement, indicator response, pressure and other observations
What changed?	Configuration, temperature, fluid, drag or previous cycle response
What decision is needed?	Hold, revised procedure, revised calculation or recovery alternative

Evidence: U1, U2, U3, MR09. See source register.

MODULE 13

Recovery, inspection and vendor return

The run ends when the vendor receives the tool and the information needed to service it.

The return through the rotary

Plan the rig floor handling sequence before the jar arrives at surface. Confirm the model's required state and restraint procedure, the lifting arrangement, tong areas and the position of everyone in the movement envelope. Give the crew the run history, especially any abnormal cycle, suspected damage or exposure beyond the plan.

The supplied historical drilling jar guide specifies a particular clamp installation condition on return. The historical fishing jar handbook warns about the movement of a closed suspended tool. Use the current instructions for the actual model to control the transition from a loaded string to a supported tool. Keep the operating crew and handling crew aligned as weight transfers. An operation that went well downhole can still expose people during the final lift.

Evidence: U2, U3, MR05, MR09. See source register.

Cleaning, preserving and isolating concerns

Once the tool is in the approved supported state, inspect its exterior for leakage, wear, impact damage and thread or mandrel concerns. Clean and flush only as the current vendor instructions and site environmental controls allow. Account for the drilling fluid and any contamination so that wash water and residues enter the proper containment and waste process.

Apply the specified end protection and preserve the tool for transport. Record the returned restraint state and every accessory. If the jar may contain pressure, hazardous residue or contamination, identify that condition to the responsible service personnel and use the site's approved process. Do not open a port or service joint to prove the tool is empty. Tag a suspect tool so that another crew cannot mistake it for a released ready to run tool.

Evidence: U2, U3, MR05, MR09. See source register.

The vendor return packet

Include the actual run interval and tool identity, the installed assembly, the service exposure and the jarring event history. Record maximum observed conditions with units and their measurement basis. Identify any uncertainty or missing measurement. Describe abnormal behavior, handling damage and exposure to fluids or conditions that the service center needs to manage safely.

Ask the vendor to close the loop with its inspection findings and service disposition. Those findings can improve the next job's planning and the training series. Keep the original observations separate from later interpretations so that a service diagnosis does not overwrite the field record.

Return item	Minimum useful record
Tool and accessories	Serials, ticket, end protectors and restraint status
Run and assembly	In/out times, depths, actual tally and configuration changes
Exposure	Hours, temperature, fluids and relevant pressure/load observations
Jarring	Direction, cycle history, approved targets and observed response
Condition	Leaks, damage, contamination, exceeded limits or uncertainties
Closeout	Vendor receipt, inspection request and resulting disposition

Evidence: U2, U3, U4, MR05, MR09. See source register.

MODULE 14

Practice, teachback and the next level

Turn the concepts into an observable crew skill and a better job record.

The supported tool walkdown

With the jar safely supported and the responsible supervisor present, ask the learner to identify the exact model and serial number, the end connections, the approved handling areas and the document revision. The learner should point out where movement can occur and explain how the actual model controls that movement during handling. No firing or improvised bench test is part of this exercise.

Next, present the issued BHA and operating sheet. Ask the learner to distinguish hook load, overpull, allowable working load and yield strength. Ask what pump open force means and where the approved pressure assumptions come from. The learner should be able to find the right instruction rather than recite a setting from memory. Record any gap and repeat the explanation before the person takes a task that depends on it.

Evidence: U1, U2, U3, MR08. See source register.

The tabletop recovery exercise

Give the crew a fictional sticking event with a known jar model, an approved operating sheet and several observations. Ask for the missing information before discussing direction. Have the driller explain the model's starting state, the supervisor state the limits and review point, and the recorder show how the first cycle will enter the log. Change one condition, such as the pump state or reported drag, and ask what must be rechecked.

Score the reasoning, communication and use of the issued instructions. The objective is a coordinated crew that recognizes when an assumption has changed. A quiz result alone does not demonstrate the physical handling or control skills required on a rig. The employer and operator remain responsible for task authorization and competency assessment.

Evidence: U1, U2, U3, MR08. See source register.

Building the 201 series

The next level should add a vendor reviewed module for each jar family actually used by the audience. Each module needs a current model drawing, serialized configuration example, corrected operating instructions and a supervised demonstration recorded with permission. Build separate lessons for drilling placement analysis, fishing assembly design, energizer selection, interpreting run data and service center inspection.

Publish revisions with a date, change record and named technical reviewer. Retire outdated instructions while preserving them as historical source evidence. Use anonymized field examples only after the operator and source owner authorize public use. The strongest course grows from clear concepts into model specific competence through reviewed instruction, observed practice and an honest feedback loop.

Evidence: U1, U2, U3, MR08. See source register.

Field scenarios

Discuss the evidence before choosing the response. The job supervisor and vendor establish the actual operating action.

01. The unmarked substitute

A replacement jar arrives with the expected connection, but its model tag differs from the approved BHA package. The delivery driver says it is equivalent.

What should happen before release to run?

A. Accept it because the ends fit

B. Hold technical acceptance and reconcile the actual model, service release, design and instructions

C. Copy the previous jar's settings onto the ticket

Facilitator response: B. Connection fit alone does not establish mechanism, direction, limits or handling compatibility. Preserve the delivery record and get the responsible engineering and vendor review.

02. The clock keeps running

A hydraulic jar has not produced a clearly identified blow within the delay the crew remembers from another tool. Current load remains within the issued program.

What is the useful next action at the planned review point?

A. Add load because more force always speeds the jar

B. Compare actual state and conditions with the model instruction and contact support using the log

C. Change pump conditions without consulting the well plan

Facilitator response: B. A remembered delay is not a diagnostic limit. Verify reset, reference, drag, pump state, torque and observations without improvising a new envelope.

03. The interrupted handover

The relief driller learns that the string was jarred, but cannot find the direction, current tool state or last approved surface target.

What must the crew resolve?

A. Continue at the last value visible on the indicator

B. Reconstruct the current approved plan and observed state with the outgoing crew and supervisor

C. Start a new sequence using this course as the procedure

Facilitator response: B. An incomplete state handover can create an unintended cycle. Use the job record and responsible people to establish the current model instructions and authority.

04. A closed suspended tool

The crew prepares to suspend a fishing jar with weight below it. The historical handbook warns that a closed jar can open through its stroke.

What should control the lift?

A. A hand placed near the moving section to feel movement

B. The current model's approved handling state, lifting arrangement and controlled movement envelope

C. A verbal assurance that it did not move on the last job

Facilitator response: B. Weight transfer can change the tool's behavior. Confirm the applicable model procedure and keep people out of the possible travel and pinch zones.

05. The successful run with a leak

The fish comes free. At surface, the crew notices oil near a jar service joint and wants to wash it down and return it as normal.

What information belongs in closeout?

A. Only that fishing succeeded

B. Document the observed leak, tool identity and run conditions, then preserve and tag it for vendor review

C. Open the internal joint to identify the seal

Facilitator response: B. A successful recovery does not erase tool condition. Record evidence before cleaning, follow the approved preservation process and let qualified service personnel investigate.

Knowledge check

Answer individually, then use the explanations to discuss the reasoning. Completion records indicate educational participation. Field authorization remains separate.

01. What should identify the operating instructions for a rental jar?

A. The tool's paint color

B. The exact manufacturer, model, configuration and serialized release package

C. The last jar used by the crew

02. Which statement best describes this course?

A. It certifies the learner to operate every jar

B. It develops foundation understanding alongside issued procedures and supervised practice

C. It replaces the vendor's operating guide

03. A historical specification lists tensile yield. How should the crew use that value?

A. As the preferred jarring target

B. As permission to exceed a working load briefly

C. As a strength term distinct from the current allowable job envelope

04. What does double acting mean?

A. The jar can provide its specified impact action in both directions

B. The jar resets the same way in each direction

C. Any jar can produce a down blow

05. What determines whether an external safety clamp is needed?

A. Every jar always needs one

B. The actual model's handling instructions and released configuration

C. The crew's usual preference

06. What is the safest interpretation of a delayed release?

A. The jar is broken

B. The crew should add load until it hits

C. A condition to compare with the model procedure and approved review criteria

07. Why can surface hook load differ from load at the jar?

A. Buoyancy, friction, weight distribution and well geometry influence the system

B. The indicator always reads jar load directly

C. A fixed multiplier explains every well

08. Does standpipe pressure automatically equal the differential used for pump open force?

A. Yes

B. Only when the jar is painted the same color

C. No, the relevant differential and effective area must be defined for the model

09. What should happen after a tool substitution changes the model or connection?

A. Run it if the threads make up

B. Recheck engineering, handling and operating requirements before release

C. Use the previous tool's targets

10. Which statement about jarring direction is sound?

A. Always go back the way the pipe came

B. Direction follows the diagnosed situation, tool capability and approved recovery objective

C. Always start downward

11. What should follow a blow before another cycle?

A. Immediate reloading at a higher target

B. The exact model's reset and an assessment of the observed response

C. A fixed wait copied from a different jar

12. Can torque permission be transferred from one jar family to another?

A. Yes, if OD is similar

B. Yes, if the well is shallow

C. No, use the actual model and combined load instructions

13. Which action improves a vendor troubleshooting call?

A. Report only that the jar does not work

B. Provide identity, configuration, commanded conditions and time ordered observations

C. Estimate every unknown so no field remains blank

14. What belongs with the returned tool?

A. Only the delivery ticket

B. Run exposure, jarring history, observed condition and contamination information

C. A statement that the fish came free

15. What should the crew do with the contradictory downward paragraph in the historical drilling jar guide?

A. Choose the more familiar direction word

B. Obtain corrected current vendor instructions before operational use

C. Average the two timing descriptions

Answer explanations

01. B

Similar looking jars can have different directions, release mechanisms and handling requirements. Match the actual tool to its current instructions.

02. B

Knowledge is part of competence. Task authorization and practical assessment remain with the responsible employer and operator.

03. C

Yield, allowable working load, hook load and overpull describe different things. The current approved system envelope controls.

04. A

Double acting describes capability. It does not make starting states, load conditions or reset instructions universal.

05. B

Some models have external restraints and others use different arrangements. Follow the actual tool instructions.

06. C

Delay depends on mechanism and conditions. Elapsed time alone does not justify a new target or prove a fault.

07. A

The issued engineering model translates the intended load using defined assumptions. Check those assumptions against actual conditions.

08. C

Pressure locations and pressure balance matter. Pump changes must also respect the well plan and well control requirements.

09. B

A substitution can change compatibility, limits, handling and mechanism behavior. Review the actual configuration.

10. B

A rule of thumb may prompt discussion but cannot replace diagnosis and tool capability. Some jars provide only an upward blow.

11. B

Correct reset is part of the tool's state sequence. Movement at surface does not automatically demonstrate the internal state.

12. C

Torque limits and restrictions differ. A model that permits a particular technique does not establish permission for another.

13. B

A factual sequence helps support distinguish operating state, load transfer, changing conditions and possible service concerns.

14. B

Service personnel need an honest record even after a successful recovery. Tool exposure and condition affect service decisions.

15. B

The defect is visible source evidence. Training should preserve the conflict and require an authoritative correction rather than guess.

Glossary

Term	Meaning
Accelerator	An accessory that stores energy for a compatible jarring system. Also called an energizer or intensifier in some product families.
Allowable working load	The permitted working load under the stated conditions. It is distinct from yield strength and requires the current job basis.
Anvil	The striking surface that receives impact from the jar's moving hammer.
BHA	Bottom hole assembly. The components near the lower part of the string whose actual configuration must appear in the tally.
Bumper sub	A tool providing axial travel or a bumping function according to its model. Its purpose differs from a hydraulic jar.
Buoyancy	The fluid's upward effect on the immersed assembly, which changes effective weight from its weight in air.
Combined load	Simultaneous loading such as tension and torque. Individual ratings do not automatically apply together at their maxima.
Compression	Axial loading that tends to shorten the member or assembly.
Differential pressure	The difference between specified pressures. The relevant locations must be defined for the calculation.
Double acting	Capable of the specified jarring action in both axial directions. Reset and loading instructions may differ by direction.
Drag	Resistance to axial movement associated with the string's interaction with the well and its contents.
Drilling jar	An impact tool installed in a drilling assembly for an anticipated recovery need, with drilling exposure requirements.
Energizer	A compatible energy storage accessory used with a jar. Its arrangement requires assembly design.
Fish	Equipment or material left in the well that a recovery operation intends to engage, move or retrieve.
Fishing jar	An impact tool selected as part of a recovery assembly. Direction and release mechanism vary by model.

Term	Meaning
Free string reference	The defined load reference used in an issued operating calculation. The exact meaning must be stated for the job.
Hammer	The moving striking part in the conceptual jar impact system.
Hook load	The load indicated at surface through the rig’s measurement system under the stated conditions.
Hydraulic metering	Restricted movement of fluid that controls a delay or part of a jar’s movement in a hydraulic design.
HWDP	Heavy weight drill pipe. It can form part of the BHA and moving mass in an approved design.
Impact	The short duration force event when striking surfaces meet.
Impulse	Force integrated over the duration of an event. For a constant force illustration it equals force multiplied by time.
Latch	A mechanism that restrains movement or provides a release function according to the particular model.
Mandrel	A central moving member in many jar designs. Its polished functional surfaces need protection.
Neutral point	The location where axial force crosses zero between tension and compression under a stated operating condition. The surrounding transition zone is distinct from that location.
Overpull	Pull above a specified reference load. It must not be confused with total hook load.
Pump open force	A pressure related axial extension force discussed for certain jar designs. Its pressure balance and effective area are model specific.
Reset	The return of the release mechanism to the state required for another authorized cycle.
Safety clamp	An external restraint used on some models during specified handling stages. Other tools use different arrangements.
Service joint	An internal tool assembly connection whose handling and service requirements differ from the string’s end connections.
Shock tool	A tool primarily intended to moderate drilling vibration rather than provide the recovery jar function.
Slack off	A controlled reduction of surface support load under the applicable operating procedure.

Term	Meaning
Stroke	Available relative axial travel in the tool. The actual dimension and stages depend on the model.
Tension	Axial loading that tends to extend the member or assembly.
Yield strength	A material or component strength threshold under stated test assumptions. It is not an operating target.

Source register & review scope

Checked 4 November 2026. Public documents may be historical even when currently hosted. A source link is a reference for learning, not confirmation that its ratings or procedures apply to a delivered tool. Internal uploaded references inform this course but their source files, branding and sales claims are not redistributed.

U1. Internal historical reference: drilling jar foundation training, 47 slides

Internal source retained privately. Concept references include slides 2–3, 6–12, 20, 24–35 and 41–46. Source date unconfirmed. Numerical settings and sales claims excluded.

U2. Internal historical reference: double acting hydraulic drilling jar guide, revision 3–6.21

Internal source retained privately. Pages 1–4. Direction wording conflict and delay differences remain unresolved. Current corrected vendor instructions are required for operational use.

U3. Internal historical reference: straight pull fishing jar handbook, revision 4100 R4, September 2005

Internal source retained privately. Pages 3–4 support principles and handling awareness. An apparent editorial carryover in the Construction paragraph is excluded.

U4. Internal historical reference: jar specification brochure, July 2020

Internal source retained privately. Used to teach reading rating definitions. No numerical rating becomes a current operating target.

MR01. SLB Energy Glossary: jar

Terminology and impact mechanism. Retrieved November 4, 2026.

https://glossary.slb.com/Terms/j/jar.aspx

MR02. SLB Energy Glossary: mechanical jar

Mechanical trip and slickline terminology differ. Retrieved November 4, 2026.

https://glossary.slb.com/terms/m/mechanical_jar

MR03. Weatherford: Jars, Shocks and Accelerators

Historical catalog, copyright 2008–2011. Used for model differences, not job settings.

https://www.weatherford.com/Documents/Catalog/Jars,-Shocks-and-Accelerators

MR04. NOV: Griffith Double Acting Hydraulic/Mechanical Drilling Jar

Internal latch example. Retrieved November 4, 2026.

https://www.nov.com/products/griffith-double-acting-hydraulic-mechanical-drilling-jar

MR05. SLB: Hydra Jar AP operating procedures

Model example for torque restrictions, placement and handling. No numerical settings adopted.

https://www.slb.com/-/media/files/smith/product-sheets/hydra-jar-ap-operating-procedures-ps.ashx

MR06. Weatherford: Dailey Hydraulic Drilling Jar technical sheet

Historical technical sheet 170.07, copyright 2005–2010. Rating definitions and variant differences.

https://www.weatherford.com/documents/technical-specification-sheet/products-and-services/drilling/dailey-hydraulic-drilling-jar/

MR07. Weatherford: pump open force, Dailey lubricated bumper subs

Bumper sub chart, not a drilling jar calculation. Conceptual dimensional reference only.

https://www.weatherford.com/documents/brochure/products-and-services/intervention-and-abandonment/pump-open-force-dailey-lubricated-bumper-subs/

MR08. NOV: Drilling Jar Placement Program

Engineering placement, impact and impulse analysis. Retrieved November 4, 2026.

https://www.nov.com/products-and-services/tools/drilling-jar-placement-program

MR09. NOV: Bowen Type Z Oil Jar instruction manual 4065

Historical September 2005 manual. Metering, reset and handling concepts only.

https://www.nov.com/-/media/nov/files/products/wbt/downhole/bowen-type-z-oil-jar/bowen-type-z-oil-jar-instruction-manual.pdf

MR10. NOV: Bowen Jar Intensifier Tool

Compatible system energy storage. Retrieved November 4, 2026.

https://www.nov.com/products/bowen-jar-intensifier-tool

MR11. Weatherford: Dailey Lubricated Bumper Sub

Historical technical sheet 1361.05, copyright 2005–2011. Bumping/sliding function and handling distinctions.

https://www.weatherford.com/documents/technical-specification-sheet/products-and-services/intervention-and-abandonment/dailey-lubricated-bumper-sub/

MR12. NOV: PowerStroke Drilling Jar

Double acting hydraulic product example. Retrieved November 4, 2026.

https://www.nov.com/products/powerstroke-drilling-jar

MR13. SLB: Hydra Jar AP product overview

Double acting hydraulic product example. Retrieved November 4, 2026.

https://www.slb.com/products-and-services/innovating-in-oil-and-gas/well-construction/drilling/directional-drilling/bha-tools/hydra-jar-ap-double-acting-hydraulic-drilling-jar

MR14. DTI: Wireline Hydraulic Jar product sheet

Wireline upward hydraulic impact example. Retrieved November 4, 2026.

https://s3.eu-west-2.amazonaws.com/assets.dti.uk.com/DTI-Product-Sheet-Wireline-Hydraulic-Jar.pdf

MR16. Hunting: Wireline Hydraulic Jar

Upward wireline jar example. Retrieved November 4, 2026.

https://huntingplc.com/products-services/well-intervention-equipment/slickline-equipment/wireline-hydraulic-jar/

MR17. Hunting: Mechanical Linear Jar

Slickline mechanical design example. Retrieved November 4, 2026.

https://huntingplc.com/products-services/well-intervention-equipment/slickline-equipment/mechanical-linear-jar/

MR18. SLB: Accelerator AP Impact Tool

Compatible local energy storage. Retrieved November 4, 2026.

https://www.slb.com/products-and-services/innovating-in-oil-and-gas/well-construction/drilling/directional-drilling/bha-tools/accelerator-ap-impact-tool

MR19. NOV: Bowen Super II Fishing Jar

Dedicated fishing jar family. Retrieved November 4, 2026.

https://www.nov.com/products/bowen-super-ii-fishing-jar

Maintenance of this series

Keep the general 101 course separate from model specific supplements. Each supplement should carry manufacturer, model, size, manual revision, service ticket, reviewer and date. Revise a lesson when vendor findings or corrected manufacturer instructions change the teaching. Preserve earlier versions and document what changed. The proposed 201 series can build on placement engineering, sticking diagnosis, fishing assembly design, load interpretation, and structured failure review.