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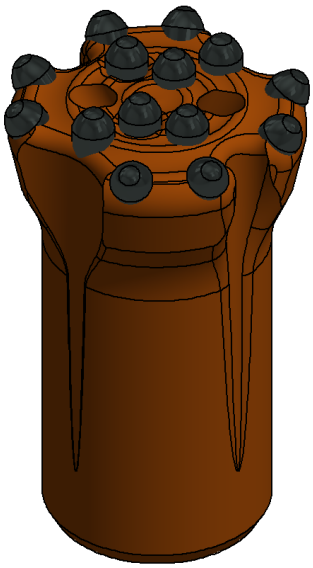
BUTTON BIT FAILURES

BODY WASH



PROBABLE CAUSE	RECOMMENDED ACTION
EXCESSIVE FLUSHING VOLUME	REDUCE FLUSHING VOLUME FOR DRILL CONDITIONS
INADEQUATE FLUSHING TO REMOVE THE CHIPS FROM THE HOLE	ADJUST FLUSHING TO MATCH CONDITIONS

SPLIT SKIRT

PROBABLE CAUSE	RECOMMENDED ACTION
DRILLING WITH LOOSE THREADS	INCREASE FEED PRESSURE AND ENSURE TIGHT JOINTS BEFORE DRILLING
IMPROPER UNCOUPLING PROCEDRUE	REDUCE FEED PRESSURE AND ROTATION WHEN UNCOUPLING
DRILLING WITH WORN THREADS	REPLACE WORN COMPONENT
HAMMERING BEFORE THE THREADS ARE FULLY MATED	ENSURE PROPER DRILLING PROCEDURE

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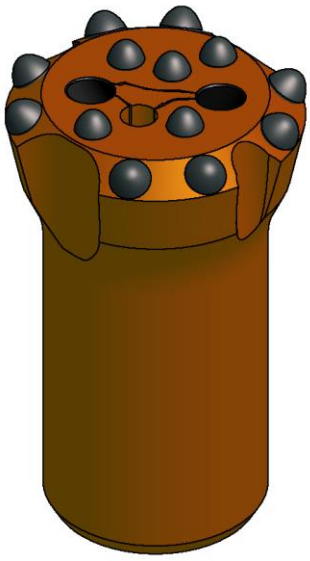
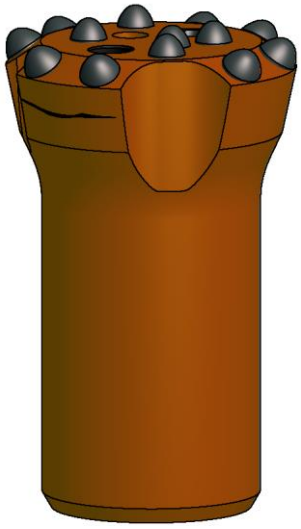
CRACKS BETWEEN BUTTONS OR FLUSHING HOLES



PROBABLE CAUSE	RECOMMENDED ACTION
FINAL FAILURE FOR HEAVY DUTY BITS WITH VERY LARGE BUTTONS	REPLACE BIT AND POTIENTALLY TRY ANOTHER BIT DESIGN

CRACKS INITATING FROM BUTTON HOLE



PROBABLE CAUSE	RECOMMENDED ACTION
STEEL FATIGUE	NORMAL FAILUE MODE FOR VERY WORN BIT

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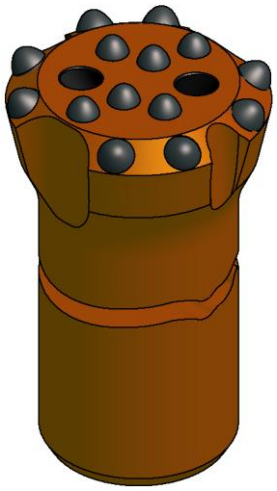
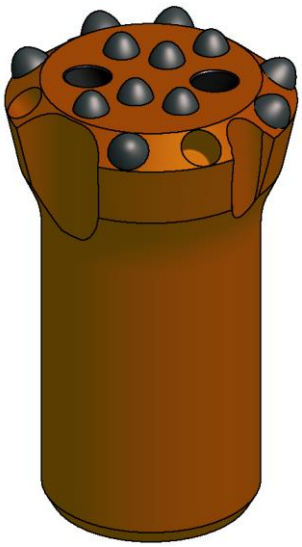
SKIRT RING OFF



PROBABLE CAUSE	RECOMMENDED ACTION
EXCESSIVE ROTATION APPLIED TO STUCK BIT	APPLY MINIMAL HAMMER PRESSURE BEFORE ROTATION ON STUCK BIT
IMPROPER COLLERING PRACTICE	REDUCE PERCUSSION AND FEED PRESSURE WHEN COLLERING
CORROSION	IMPROVE STORAGE PRACTICES
HAMMERING ON BIT TO BREAK CONNECTION	LOOSEN BIT ON SOLID ROCK USING MINIMAL FEED AND ROTATION PRESSURE
EXCESSIVE BACKHAMMERING	CHANGE TO A RETRAC BIT AND ENSURE PROPER DRILLING PROCEDURE
LOW ROCK RESISTANCE	REDUCE FEED AND PERCUSSION POWER
FINAL FAILURE	NORMAL FAILURE MODE FOR WORN BIT

LOST BUTTONS



PROBABLE CAUSE	RECOMMENDED ACTION
FREE HAMMERING	INCREASE FEED PRESSURE AND DON'T HAMMER UNTIL IN CONTACT WITH ROCK
INADAEQUATE FEED PRESSURE	INCREASE FEED PRESSURE
SCALING WITH BIT	USE PROPER SCALING TOOL

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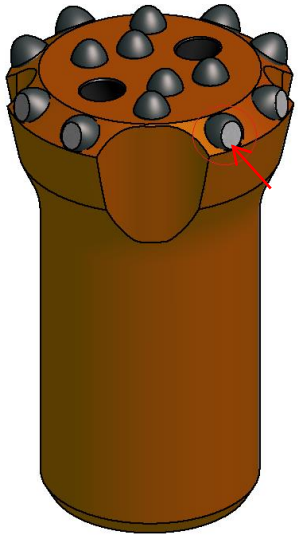
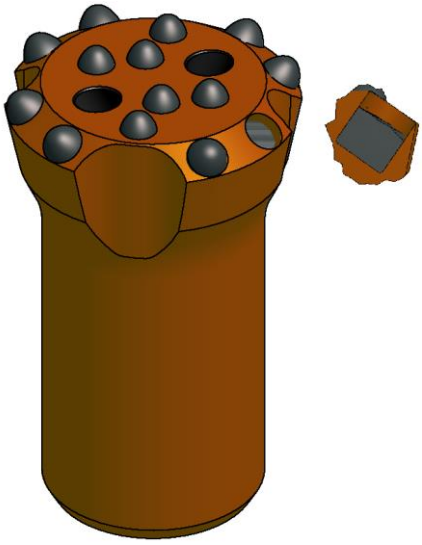
MICRO CRACKING ON CARBIDES (SNAKESKIN)



PROBABLE CAUSE	RECOMMENDED ACTION
DRILLING INTO NON-ABRASIVE MATERIAL	INCREASE REGRINDING FREQUENCY
	USE A BIT WITH A SOFTER CARBIDE

BUTTON SHEAR UNDER BODY LEVEL



PROBABLE CAUSE	RECOMMENDED ACTION
EXCESSIVE BUTTON PROTRUSION	INCREASE REGRINDING FREQUENCY
CARBIDE PINCHING IN THE HOLE DUE TO WORN CARBIDES	REGRIND OR REPLACE BIT

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BUTTON CRUSHED INSIDE BODY

PROBABLE CAUSE	RECOMMENDED ACTION
INCORRECT COLLERING PRACTICE	REDUCE FEED AND IMPACT PRESSURE WHEN COLLERING
ANTI-TAPER FROM ABRASIVE ROCK	GRIND TO ORIGINAL TAPER
EXCESSIVE PROTRUSION FROM IMPROPER GRINDING	ENSURE PROPER GRINDING PRACTICE

CHIPPED BUTTON

PROBABLE CAUSE	RECOMMENDED ACTION
OVER DRILLING	REDUCE GRINDING INTERVAL
SNAKESKIN	INSPECT THE CARBIDES REGULARLY FOR MICRO-CRACKING
CARBIDE IS TOO HARD	USE A BIT WITH A SOFTER CARBIDE
REGRINDING ALREADY FRACTURED MATERIAL	INCREASE ROTATION SPEED
DAMAGED IN THE HANDLING PROCESS	USE BEST PRACTICES IN HANDLING BIT TRASPORTATION AND STORAGE

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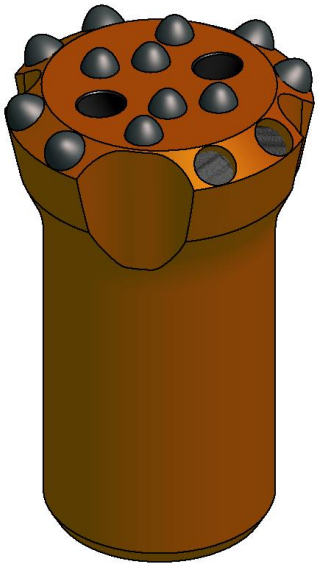
CARBIDE CRUSHED DOWN TO LEVEL OF BIT BODY



PROBABLE CAUSE	RECOMMENDED ACTION
SNAKESKIN	INCREASE REGRINDING FREQUENCY
OVERDRILLING	INCREASE REGRINDING FREQUENCY
INCORRECT GRINDING PROCEDURE	DRY GRINDING CAN LEAD TO SNAKESKIN, TRY WET GRINDING
BUTTON CARBIDE TOO HARD	USE A BIT WITH A SOFTER CARBIDE

CRACKED BUTTON

PROBABLE CAUSE	RECOMMENDED ACTION
OVERDRILLING	INCREASE REGRINDING FREQUENCY
SNAKESKIN	INCREASE REGRINDING FREQUENCY
INCORRECT GRINDING PROCEDURE	DRY GRINDING CAN LEAD TO SNAKESKIN, TRY WET GRINDING
BUTTON CARBIDE TOO HARD	USE A BIT WITH A SOFTER CARBIDE
DAMAGED IN THE HANDLING PROCESS	USE BEST PRACTICES IN HANDLING BIT TRASPORTATION AND STORAGE

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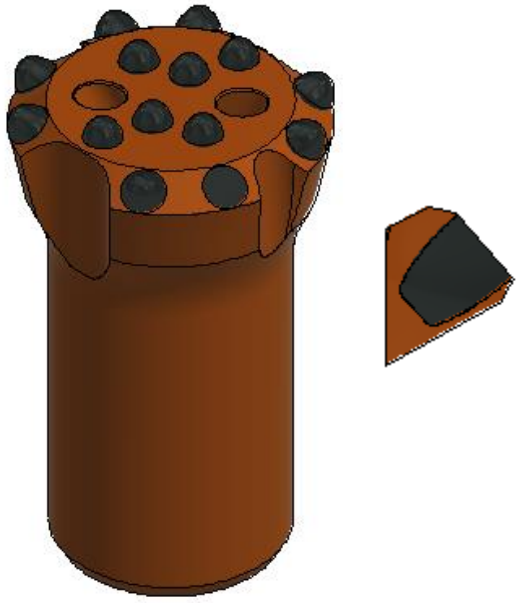
TOP OF BUTTON SHEAR OFF LEVEL WITH BODY



PROBABLE CAUSE	RECOMMENDED ACTION
OVERDRILLING	INCREASE REGRINDING FREQUENCY
SNAKESKIN	INCREASE REGRINDING FREQUENCY
DRILLING INTO METAL	USE CORRECT DRILLING PRACTICES
EXCESSIVE PROTRUSION	REDUCE REGRINDING INTERVAL

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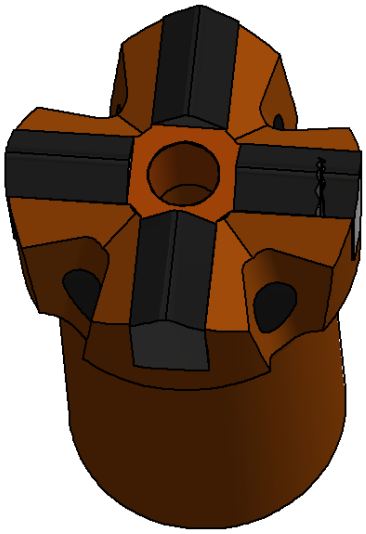
CROSS BIT FAILURES

SPLIT SKIRT (TAPER)

PROBABLE CAUSE	RECOMMENDED ACTION
WORN TAPER OR INCORRECT TAPER MATCH	CHANGE STEEL TO CORRECT TAPER
REMOVING WITH HAMMER	USE PROPER BIT REMOVAL PRACTICES
HAMMERING BEFORE BIT IS FULLY SEATED	INSURE THREADS ARE TIGHT PRIOR TO STARTING HAMMER

TRANSVERSE CRACKS



PROBABLE CAUSE	RECOMMENDED ACTION
OVERHEATING FROM IMPROPER GRINDING	USE CORRECT GRINDING PRACTICES AND REGRIND BIT
ANTI-TAPER FROM ABRASIVE ROCK	INCREASE REGRINDING FREQUENCY
SCRATCHES DUE TO INCORRECT GRINDING WHEEL	ENSURE PROPER REGRINDING PROCEDURE

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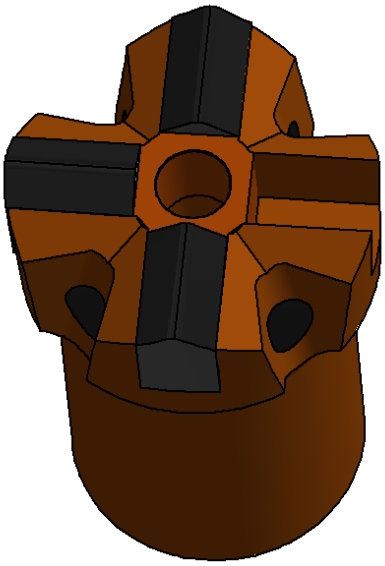
LONGITUDNIAL CRACKS

PROBABLE CAUSE	RECOMMENDED ACTION
OVERHEATING FROM IMPROPER GRINDING	REGRIND TO ORIGINAL SHAPE USING PROPER GRINDING PROCEDURE
CARBIDE IS TOO HARD	SWITCH TO A BIT WITH A SOFTER CARBIDE

LOST CARBIDE INSERT



PROBABLE CAUSE	RECOMMENDED ACTION
BRAZED JOINT FATIGUE	NORMAL FATIGUE FROM WORN BIT
CARBIDE TOO HARD	SWITCH TO A BIT WITH A SOFTER CARBIDE

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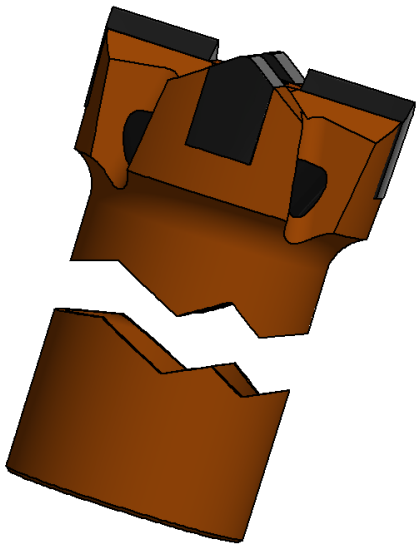
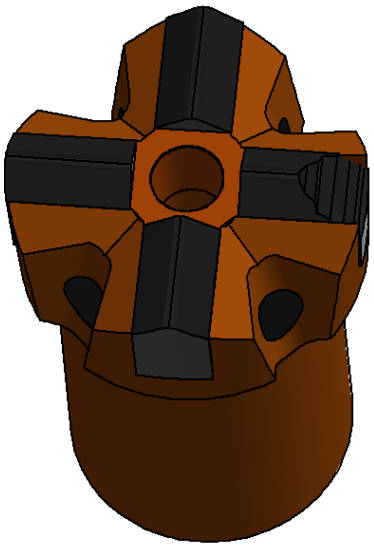
SKIRT RING OFF (TAPER BIT)



PROBABLE CAUSE	RECOMMENDED ACTION
WRONG TAPER SELECTION	USE CORRECT TAPER FOR STEEL
BROKEN TAPER	CHANGE BIT AND POTIENTALLY FIX STEEL TAPER OR REPLACE STEEL
HAMMERING TO REMOVE BIT	USE PROPER BIT REMOVAL PRACTICES
SPINNING	INCREASE FEED PRESSURE
OVERDRILLING	INCREASE REGRINDING FREQUENCY

INSERT CORNER FRACTURE



PROBABLE CAUSE	RECOMMENDED ACTION
PINCHING	ENSURE PROPER GRINDING PROCEDURE AND GRIND THE GAGE BACK TO CORRECT CARBIDE PROTRUSION
SHARP CORNERS ON ANTI-TAPER	ENSURE PROPER GRINDING PROCEDURE
HAMMERING TO REMOVE BIT	USE CORRECT UNCOUPLING, REDUCE FEED PRESSURE AND ROTATION
SNAKESKIN	INCREASE REGRINDING FREQUENCY
INCORRECT COLLERING PRACTICES	REDUCE PERCUSSION AND FEED

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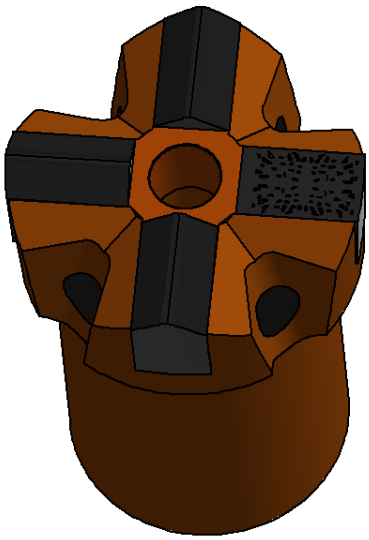
SHATTERED CARBIDE INSERT



PROBABLE CAUSE	RECOMMENDED ACTION
INCORRECT CARBIDE	USE SOFTER OR HARDER CARBIDE DEPENDING UPON ROCK CONDITION
INADEQUATE FLUSHING VOLUME	INCREASE FLUSHING VOLUME
IMPROPER GRINDING	ENSURE PROPER GRINDING PROCEDURE
STRIKING ROOF BOLT OR SIMILAR OBJECT	AVOID ROOF BOLTS IF POSSIBLE AND OR OTHER NON-ROCK MATERIAL

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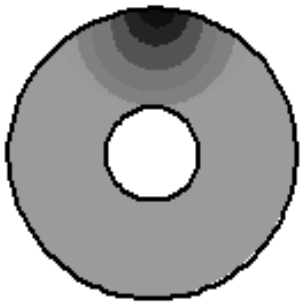
EXTENSION ROD FAILURES

SURFACE LAYER COMPRIMISED



PROBABLE CAUSE	RECOMMENDED ACTION
WORN OR NO CENTRALIZER	REPLACE OR INSTALL CENTRALIZER
HAMMERING ON STEEL	ENSURE PROPER UNCOUPLING PROCEDURE
IMPROPER STORAGE	ENSURE PROPER STORAGE
DRILL STRING DEVIATION	MONITOR DRILL STRING, IMPLIMENT GUIDE TUBE AND RETRAC BIT
EXCESSIVE FEED PRESSURE	REDUCE AND TUNE TO DRILL CONDITIONS
BENDING	MONITOR DRILL STRING AND IMPLIMENT GUIDE TUBE
POOR DRILLING CONDITIONS	TUNE DRILLING TO CONDITIONS, USE RETRAC BIT
FEEDER DAMAGED	CHECK FOR BENDING AND TWISTING OF HAMMER

SURFACE COMPRIMISED FROM FLUSHING HOLE

PROBABLE CAUSE	RECOMMENDED ACTION
CORROSIVE FLUSHING AGENT	ENSURE PROPER STORAGE PROCEDURE AND OR TREAT FLUSHING AGENT

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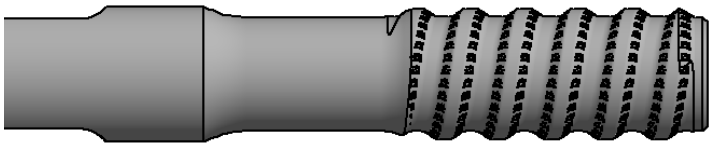
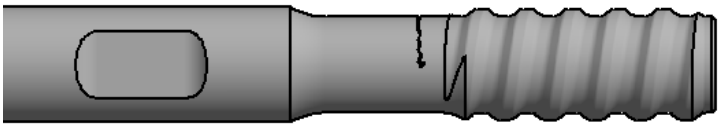


PITTING OR WEAR IN THREADS

PROBABLE CAUSE	RECOMMENDED ACTION
OVERHEATING DUE TO LOSE DRILLING	INCREASE FEED PRESSURE
FREE HAMMERING	INCREASE FEED PRESSURE
DRILLING WITH A WORN BIT	INCREASE REGRINDING FREQUENCY



FAILURE AT BEGINNING OF THREADS

PROBABLE CAUSE	RECOMMENDED ACTION
WONDERING	MONITOR DRILL STRING, USE GUIDE TUBE AND RETRAC BIT
WORN COUPLING	REPLACE WORN PARTS
BENDING DUE TO OVERFEEDING	REDUCE FEED PRESSURE
BENDING DUE TO HAMMER MISALIGNMENT	REPLACE WORN COMPONENTS PROPERLY COLLAR HOLE AND ADJUST FEED PRESSURE TO CONDITIONS
HIGH REFLECTION ENERGY DUE TO WORN BIT	INCREASE REGRINDING FREQUENCY
POOR DRILLING CONDITIONS	TUNE DRILLING FOR CONDITIONS, USE RETRAC BIT
PERCUSSION ON STUCK ROD	USE ANTI-JAMMING SYSTEM AND USE RETRAC BIT

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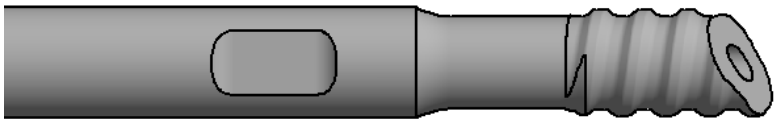
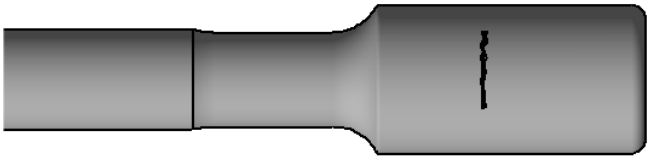


CHIPPED OR BROKEN MALE THREAD

PROBABLE CAUSE	RECOMMENDED ACTION
FEED PRESSURE TOO LOW	INCREASE FEED PRESSURE
WORN COUPLING	REPLACE WORN PARTS
BENDING DUE TO HAMMER MISALIGNMENT	REPLACE WORN PARTS
HIGH REFLECTION ENERGY DUE TO WORN BIT	INCREASE REGRINDING FREQUENCY



FAILURE ACROSS FEMALE THREADED SECTION

PROBABLE CAUSE	RECOMMENDED ACTION
BENDING DUE TO HAMMER MISALIGNMENT	REPLACE WORN COMPONENTS
FEED PRESSURE TOO LOW	INCREASE FEED PRESSURE
HIGH TORQUE FROM DRILLING WITH WORN BIT	INCREASE REGRINDING FREQUENCY
NICK OR DING IN STEEL SURFACE	ENSURE PROPER UNCOUPLING PROCEDURE

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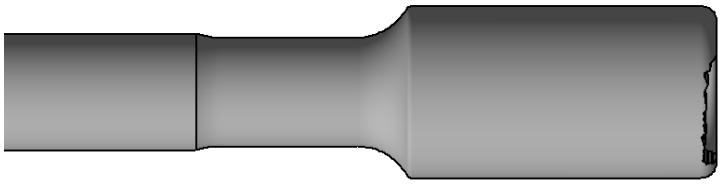
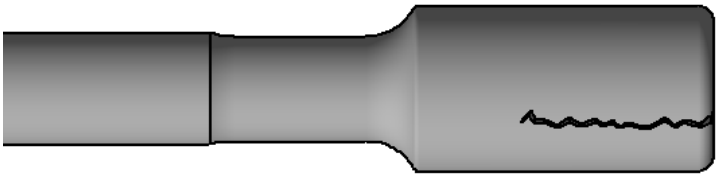


FEMALE END CHIPPED, CRACKED OR FLARED

PROBABLE CAUSE	RECOMMENDED ACTION
FREE HAMMERING	INCREASE FEED PRESSURE AND ENSURE STING IS TIGHT BEFORE DRILLING
HAMMER MISALIGNMENT	REPLACE WORN PARTS OR ENSURE PROPER DRILLING PROCEDURE IF BIT IS WONDERING
DRILL STEEL STRIKING TOP OF COUPLING	PROPERLY ALIGN STEEL PRIOR TO HAMMERING



LONGITUDNIAL CRACKS IN FEMAL SECTION

PROBABLE CAUSE	RECOMMENDED ACTION
WORN THREADS	REPLACE STEEL
HOLE DEVIATION	ENSURE PROPER DRILLING PROCEDURE, USE GUIDE TUBE AND RETRAC BIT
FREE HAMMERING	INCREASE FEED PRESSURE
HAMMER MISALIGNMENT	REPLACE WORN PARTS
HAMMERING BEFORE THE THREADS ARE FULLY MATED	INSURE THREADS ARE TIGHT PRIOR TO STARTING HAMMER

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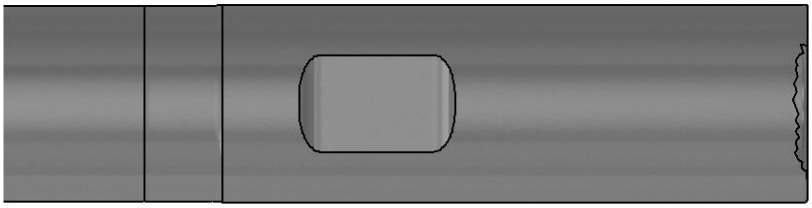
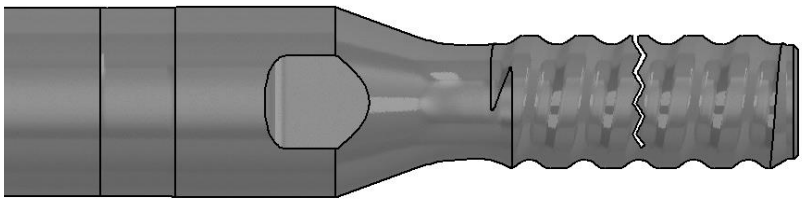
GUIDE TUBE FAILURES



FEMALE END CHIPPED, CRACKED OR FLARED

PROBABLE CAUSE	RECOMMENDED ACTION
FREE HAMMERING	INCREASE FEED PRESSURE AND ENSURE STING IS TIGHT BEFORE DRILLING
HAMMER MISALIGNMENT	REPLACE WORN PARTS OR ENSURE PROPER DRILLING PROCEDURE IF BIT IS WONDERING



FAILURE ACROSS THREADED SECTION

PROBABLE CAUSE	RECOMMENDED ACTION
BENDING DUE TO HAMMER MISALIGNMENT	REPLACE WORN PARTS
FEED PRESSURE TOO LOW	INCREASE FEED PRESSURE
HIGH TORQUE FROM DRILLING WITH WORN BIT	INCREASE REGRINDING FREQUENCY
NICK OR DING IN STEEL SURFACE	ENSURE PROPER UNCOUPLING PROCEDURE

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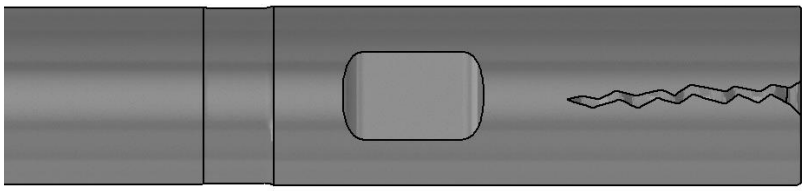
PITTING OR WEAR IN THREADS

PROBABLE CAUSE	RECOMMENDED ACTION
OVERHEATING DUE TO LOSE DRILLING	INCREASE FEED PRESSURE
FREE HAMMERING	INCREASE FEED PRESSURE
DRILLING WITH A WORN BIT	INCREASE REGRINDING FREQUENCY



LONGITUDNIAL CRACKS IN FEMAL SECTION

PROBABLE CAUSE	RECOMMENDED ACTION
WORN THREADS	REPLACE STEEL
HOLE DEVIATION	ENSURE PROPER DRILLING PROCEDURE, USE GUIDE TUBE AND RETRAC BIT
FREE HAMMERING	INCREASE FEED PRESSURE
HAMMER MISALIGNMENT	REPLACE WORN PARTS

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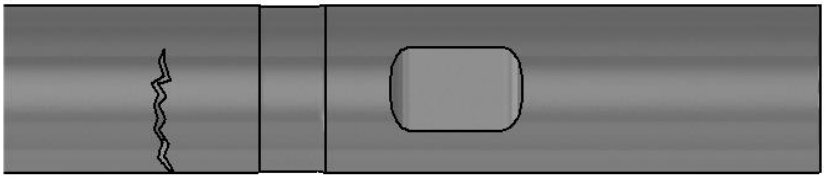

BREAK IN TUBE BODY

PROBABLE CAUSE	RECOMMENDED ACTION
WORN CENTRALIZERS	REPLACE WORN PARTS
NICK OR DENT IN SURFACE	ENSURE PROPER UNCOUPLING PROCEDURE

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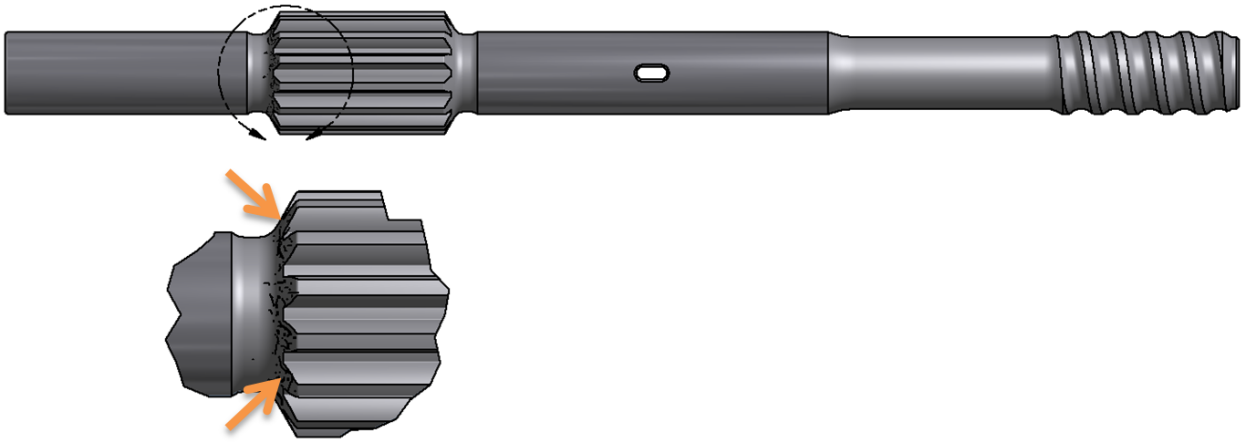
SHANK ADAPTER FAILURES

IMPACK MARKS, FRACTURED OR MUSHROOMED STRIKING FACE

PROBABLE CAUSE	RECOMMENDED ACTION
DAMAGED PISTON	RSPLACE PISTON AND SERVICE EQIPMENT
MISALIGNMENT DUE TO WORN OR DAMAGED BUSHING	REPLACE BUSHING



ABNORMAL WEAR ON BACK FACE OF SPLINES

PROBABLE CAUSE	RECOMMENDED ACTION
WORN CHUCK BUSHING	REPLACE BUSHING
DAMPENING MECHANISM DAMAGED OR INOPERABLE	REPAIR FAULTY COMPONENTS
DAMPENING MECHANISM OPERATIONAL	CHECK FOR ADEQUET PRESSURES

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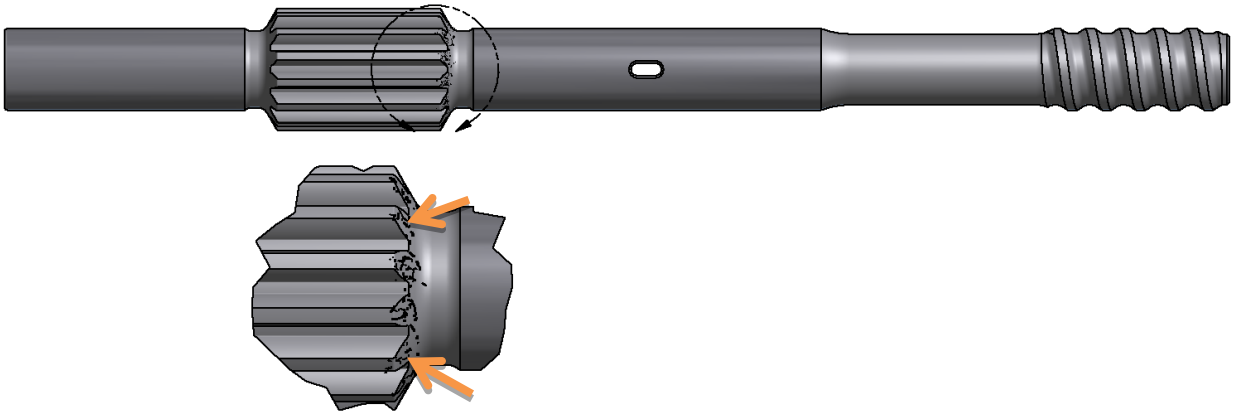

ABNORMAL WEAR ON FORWARD FACE OF SPLINES

PROBABLE CAUSE	RECOMMENDED ACTION
WORN HAMER BUSHING	REPLACE BUSHING
STUCK STRING IN BROKEN ROCK	ENSURE PROPER DRILLING PROCEDURE, USE RETRAC BIT, USE ANTI-JAMMING SYSTEM

PITTING, GALLING AND MATERIAL BUILD UP ON OUTSIDE OF SPLINES

PROBABLE CAUSE	RECOMMENDED ACTION
LACK OF LUBRICATION	ENSURE LUBRICATION SYSTEM IS OPERATIONAL WITH THE CORRECT TYPE OF LUBRICANT
EXCESSIVE ROTATION IN SOFT ROCK	TUNE ACCORDING TO DRILLING CONDITIONS
WORN CHUCK BUSHING	REPLACE BUSHING

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FAILURE IN THREADED REGION

PROBABLE CAUSE	RECOMMENDED ACTION
BENDING DUE TO HAMMER MISALIGNMENT	MONITOR DRILL STRING, USE GUIDE TUBE AND OR RETRAC BIT
BENDING DUE TO OVERFEEDING	DECREASE FEED PRESSURE
HIGH TORQUE DUE TO WORN BIT	INCREASE REGRINDING FREQUENCY
POOR DRILLING CONDITIONS	TUNE DRILLING FOR CONDITIONS, USE RETRAC BIT
LACK OF THREAD LUBRICATION	ENSURE PROPER LUBRICATION WITH PROPER LUBRICANT
DRILLING WITH LOOSE DRILL STRING	INCREASE FEED PRESSURE

CHIPPED FACE ON THREADED END

PROBABLE CAUSE	RECOMMENDED ACTION
BROKEN DRILL STEEL	REPLAE BROKEN COMPONENTS
DEVIATION IN DRILL STRING	LOOSE OR WORN COMPONENTS SHOULD BE REPLACED, USE OF GUIDE TUBE AND RETRAC BIT

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FAILURE ACROSS SPLINES

PROBABLE CAUSE	RECOMMENDED ACTION
POOR LUBRICATION	ENSURE PROPER LUBRICATION WITH CORRECT LUBRICANT
STUCK DRILL STRING/ EXCESSIVE BACKHAMMERING	USE ANTI-JAMMING SYSTEM AND RETRAC BIT
WORN CHUCK BUSHING	REPLACE BUSHING
HIGH ROTATIONAL TORQUE	DECREASE ROTATION
OVERDRILLING	INCREASE REGRINDING FREQUENCY
FEED PRESSURE TOO LOW	INCREASE FEED PRESSURE

BROKEN AT FRONT BUSHING OR FRONT HEAD

PROBABLE CAUSE	RECOMMENDED ACTION
MISALIGNED BOOM OR HAMMER	MONITOR ALIGNMENT AND REPLACE WORN PARTS
WORN FRONT BUSHING	REPLACE BUSHING

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FAILURE ACROSS FLUSHING HOLE

PROBABLE CAUSE	RECOMMENDED ACTION
CORROSION	ENSURE NUTRAL FLUSHING MEDIUM
FATIGUE	TYPICAL OF HIGH USE COMPONENT
DIRTY FLUSHING MEDIUM	CLEAN FLUSHING COMPONENTS AND OR TREAT FLUSHING MEDIUM

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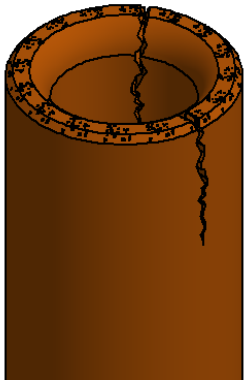
COUPLING FAILURES

IMPACT MARKS, CHIPPED OR CRACKED END



PROBABLE CAUSE	RECOMMENDED ACTION
PERCUSSION ON SHOULDER	ENSURE CORRECT COUPLING PROCEDURE
MISALIGNMENT OF HAMMER	REPLACE WORN PARTS
HOLE DEVIATION	MONITOR DRILL STRING, USE GUIDE TUBE AND RETRAC BIT

LONGITUDNIAL CRACKS

PROBABLE CAUSE	RECOMMENDED ACTION
WORN THREADS	REPLACE STEEL
HOLE DEVIATION	ENSURE PROPER DRILLING PROCEDURE, USE GUIDE TUBE AND RETRAC BIT
FREE HAMMERING	INCREASE FEED PRESSURE
HAMMER MISALIGNMENT	REPLACE WORN PARTS
BACK ROTATION WITH HAMMER	ENSURE CORRECT DRILLING AND UNCOUPLING PROCEDURE
INSURE THREADS ARE TIGHT PRIOR TO STARTING HAMMER	INSURE THREADS ARE TIGHT PRIOR TO STARTING HAMMER

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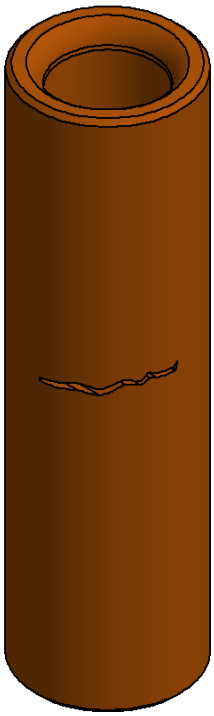
TRANSVERSE CRACKS



PROBABLE CAUSE	RECOMMENDED ACTION
NICK OR DING IN SURFACE	ENSURE PROPER UNCOUPLING AND DRILLING PROCEDURE
WORN THREADS	REPLACE
HOLE DEVIATION	MONITOR DRILL STRING, USE GUIDE TUBE AND RETRAC BIT
WORN BIT	INCREASE REGRINDING FREQUENCY

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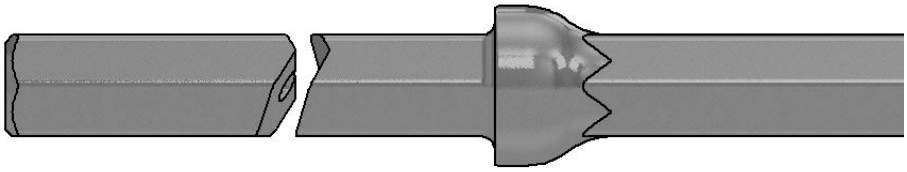
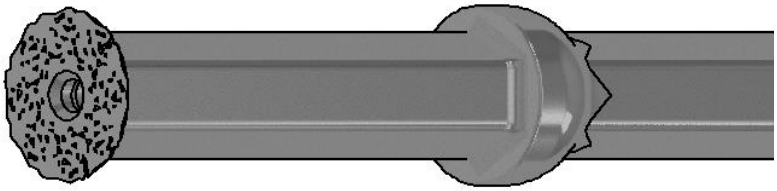
TAPER ROD/ INTEGRAL ROD FAILURES



FAILURE IN SHANK END

PROBABLE CAUSE	RECOMMENDED ACTION
WORN CHUCK BUSHING	REPLACE BUSHING
INSUFFICIENT LUBRICATION	ENSURE PROPER LUBRICAITON FROM THE OILER AND OR OTHER LUBRICATION POINTS
FREE HAMMERING	INCREASE FEED PRESSURE



STRIKING FACE DEFORMED

PROBABLE CAUSE	RECOMMENDED ACTION
WORN CHUCK BUSHING	REPLACE BUSHING
DAMAGED PISTION	REPLACE WORN PART
HIGH OPERATING PRESSURE	ENSURE PROPER OPERATING PRESSURE

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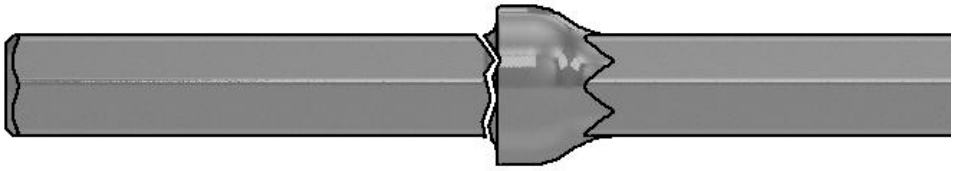
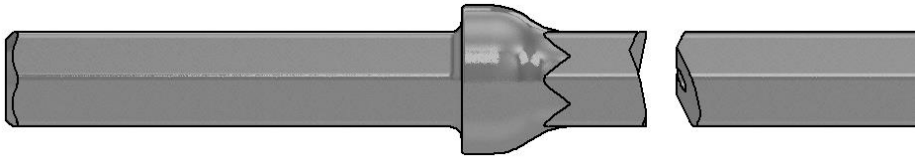


WEAR AND OR BREAK AT BEGINNING OF COLLAR RADIUS

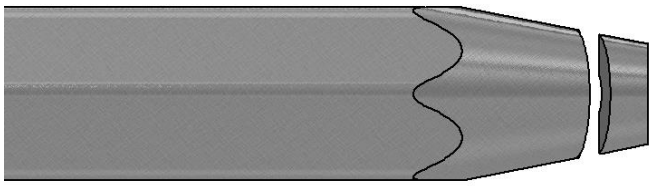
PROBABLE CAUSE	RECOMMENDED ACTION
INDENTATION BY CHUCK BUSHING	REPLACE BUSHING
OVERHEATING FROM INSUFFICIENT LUBRICATION	ENSURE PROPER LUBRICAITON FROM THE OILER AND OR OTHER LUBRICATION COMPONENTS



BREAK IN ROD SECTION

PROBABLE CAUSE	RECOMMENDED ACTION
BENT ROD	ENSURE CORRECT DRILLING PROCEDURE
SURFACE DAMAGE	ENSURE CORRECT STORAGE AND ROD HANDLING

BREAK IN TAPER RADIUS



PROBABLE CAUSE	RECOMMENDED ACTION
WORN SOCKET	REPLACE BIT
DAMAGED BIT	CHANGE BIT OR REAM IMPERFECTION
SPINNING	INCREASE FEED PRESSURE

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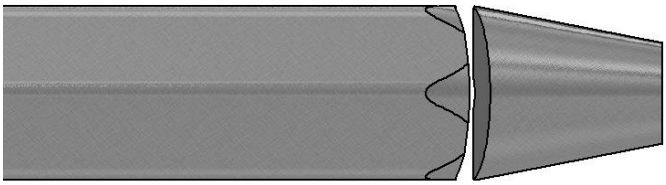
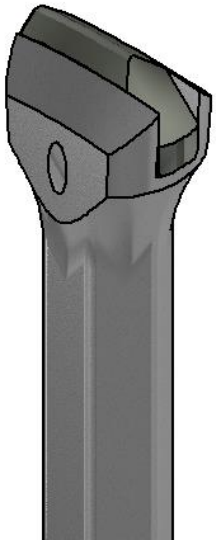
BREAK CLOSE TO BIT END



PROBABLE CAUSE	RECOMMENDED ACTION
DRILL THROUGH	ENSURE PROPER DRILLING PROCEDURE
EXCESSIVE GAGE WEAR	ENSURE PROPER GRINDING PROCEDURE AND RESURFACE GAGE

FAILURE IN CARBIDE



PROBABLE CAUSE	RECOMMENDED ACTION
IMPROPER GRINDING	ENSURE PROPER GRINDING PROCEDURE
OVERHEATING WHEN REGRINDING	ENSURE PROPER GRINDING PROCEDRUE
SNAKESKIN	INCREASE REGRINDING FREQUENCY
ANTI-TAPER	ENSURE PROPER GRINDING PROCEDURE, GRIND GAGE

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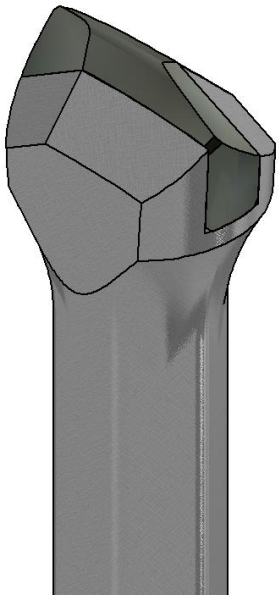
UNEVEN CARBIDE WEAR



PROBABLE CAUSE	RECOMMENDED ACTION
IMPROPER FLUSHING	INCREASE FLUSHING, TUNE TO CONDITIONS
IMPROPER ROTATION	TUNE TO ROCK CONDITIONS
IMPROPER GRINDING	SHARPEN AT THE CORRECT ANGLE