



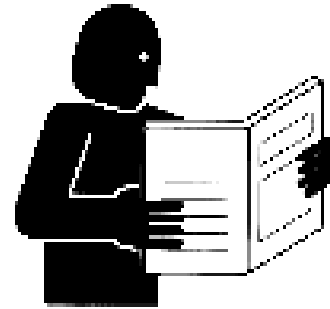
3. The Operation and Maintenance of Rice Harvester

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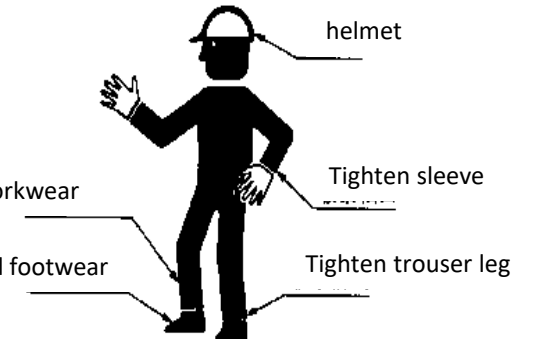
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3.1 Operational Precautions of Rice Harvester

➤ Operation Safety



Read instructions carefully
Obtain relevant operation certificates



Wear appropriately



No drinking and operating



No fatigue operating

3.1 Operational Precautions of Rice Harvester

➤ Operation Safety

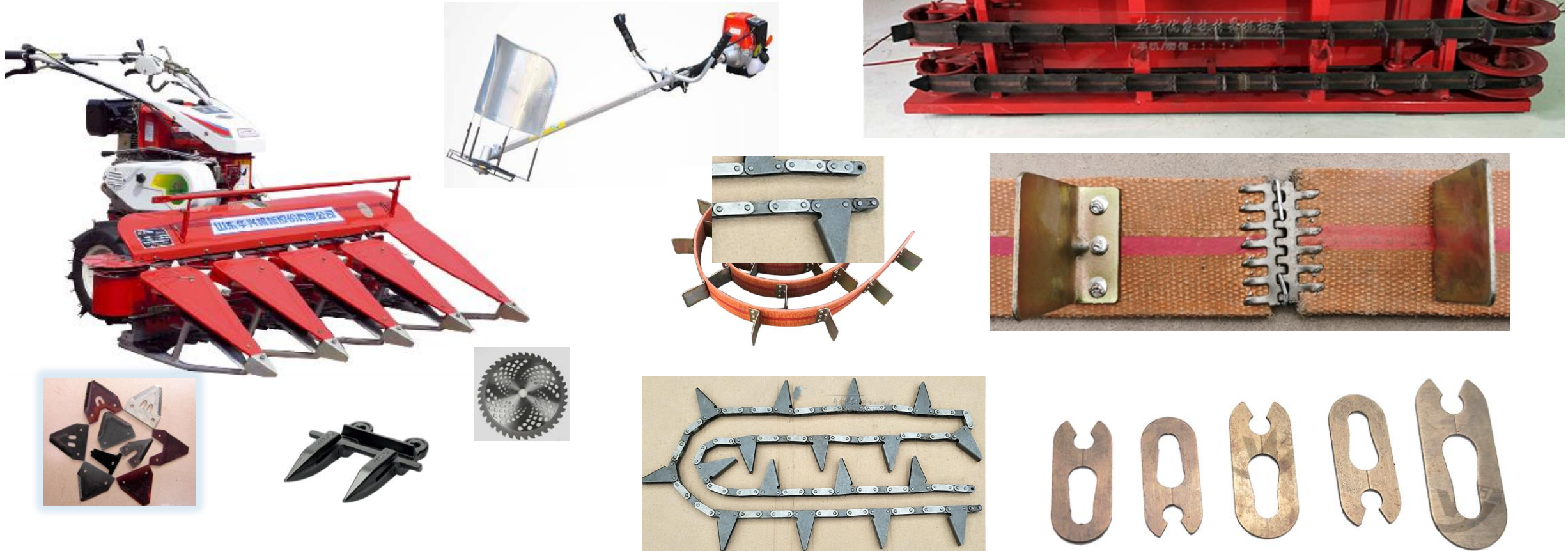


- Appropriate workwear could prevent entanglement



3.1 Operational Precautions of Rice Harvester

- Safe working conditions of equipment



- Technical conditions of all components shall meet the requirement

Clutch, Cutter Alignment, Cutter Clearance, Belt Tension, Teeth Length, Chain Tension, Buckle Direction, etc.

3.1 Operational Precautions of Rice Harvester

➤ Follow the operation procedures

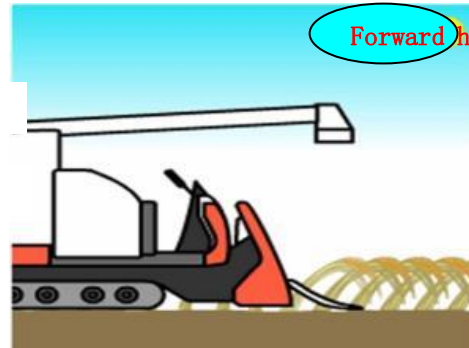
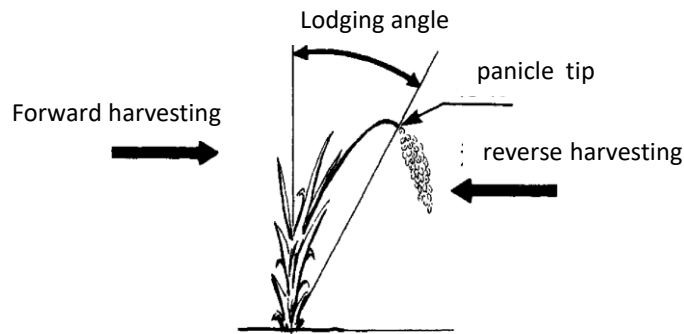


- Before operating the harvester, it is necessary to survey the roads and fields, and set clear marks on dangerous areas and obstacles.
- Conduct harvester maintenance, overhauling and troubleshooting only after the engine power is cut off. When carrying out mechanical maintenance or overhaul under the harvesting table, make sure the harvesting table is lifted and supported firmly by a safety bracket or a cushion block; Do not use open flame as illumination when maintaining machinery or adding fuel at night.
- When discharging grains, do not enter the granary, do not extend iron tools or bare hands into the granary.
- When moving to next plot, lift the harvesting platform to the highest position and lock it down, do not transport objects with stem collector.

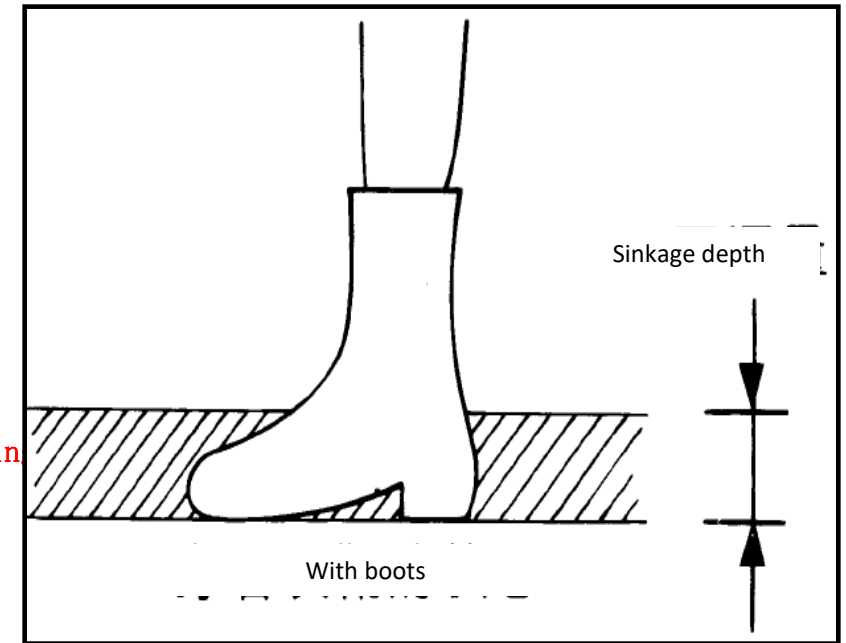
3.1 Operational Precautions of Rice Harvester

➤ Follow the operation procedures

- **Forward harvesting, Reverse harvesting**



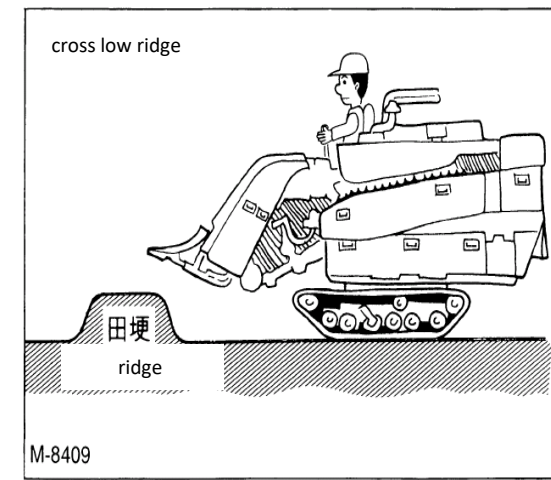
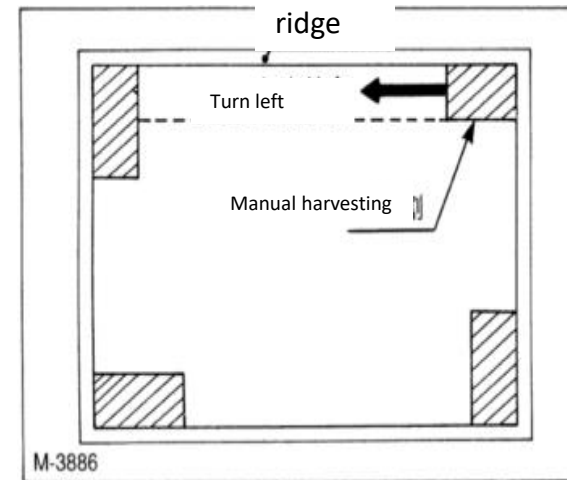
Harvesting direction	Lodging angle
Forward harvesting	< 85 degree
Reverse harvesting	Rice < 70 degree Wheat < 45 degree



Depth requirement of mud and foot in field

3.1 Operational Precautions of Rice Harvester

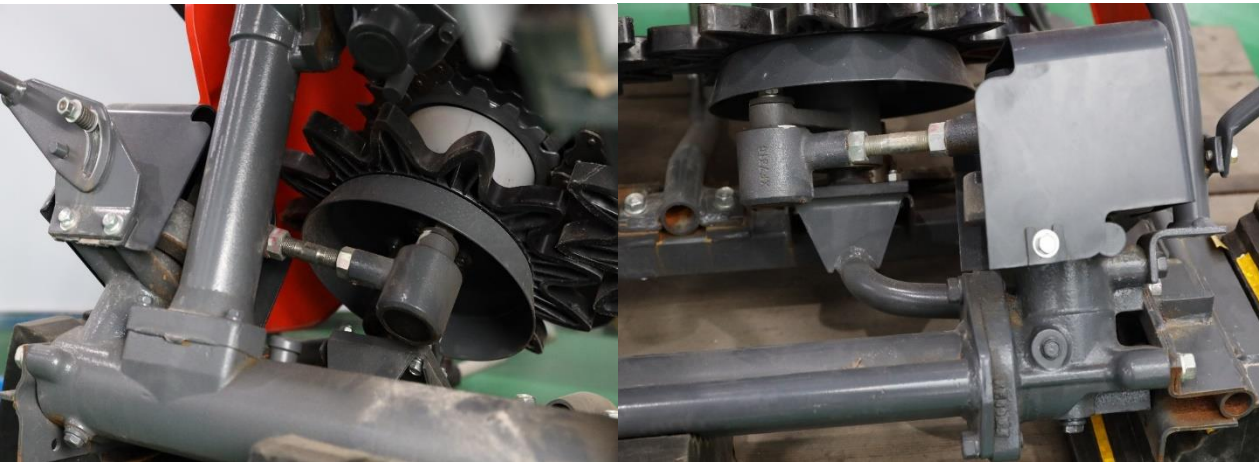
- Follow the operation procedures



- Requirement of the harvester working speed;
- According to the requirements of the dividing rod, generally operate harvesting counterclockwise;
- Do cross the ridge vertically.

3.2 Maintenance of Rice Harvester Cutting Components

➤ Semi-feed Combine Harvester



- Cutter alignment

Check the centering clearance of the moving blade (reference value: 4~6 mm), adjust contact ratio of the fixed and moving blade (reference value: <math>< 1.5\text{mm}</math>), make adjustment if necessary;

Method: cutter centering alignment is achieved by adjusting installation dimension of the cutter driving arm connecting screw rods. Adjust the rods length to 88~90mm.



- Cutter clearance

Check the clearance between the cutter and fixed blade (reference value: 0~0.5mm). Make adjustment if necessary.

Method:

Remove cutter nut, hold cutter plate, take out left, middle and right bolts at the same time, hold and lift cutter plate, remove cutter

3.2 Maintenance of Rice Harvester Cutting Components

➤ Semi-feed
Harvester

Combine



Measure the clearance between cutters, and between cutter holders, adjust the clearance between cutter and fix blade to 0~0.5mm by adding or removing gaskets.

3.2 Maintenance of Rice Harvester Cutting Components

➤ Full-feed Combine Harvester

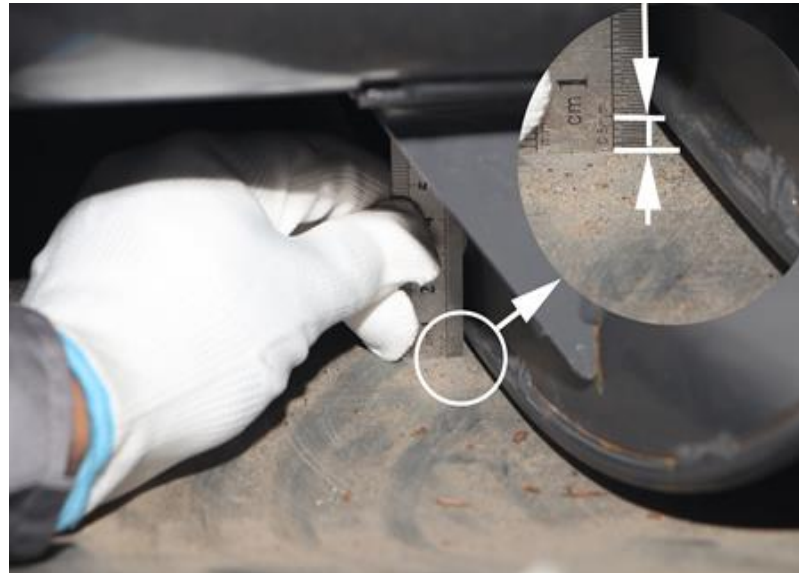
2. 2护刃~~检查与调整~~

3.3 Maintenance of Rice Harvester Conveying Components

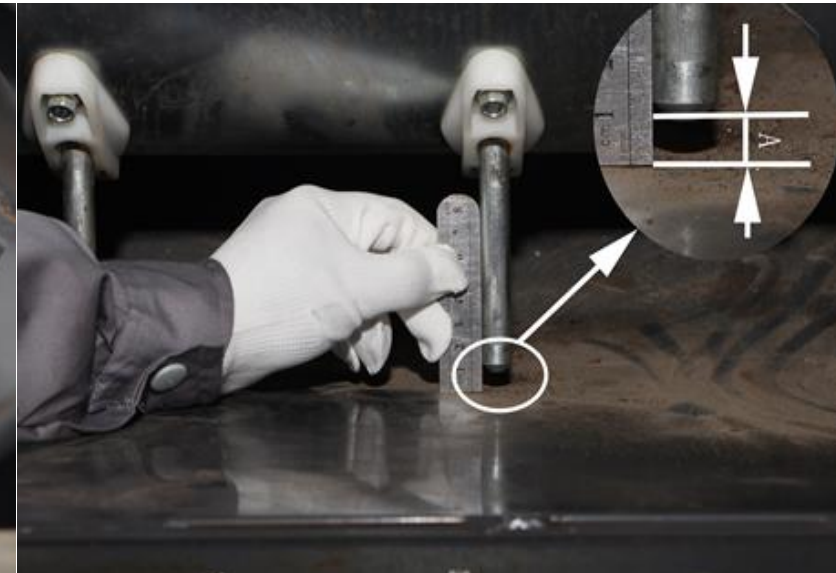
➤ Full-feed Combine Harvester (Conveying components)



Cutting table cleaning



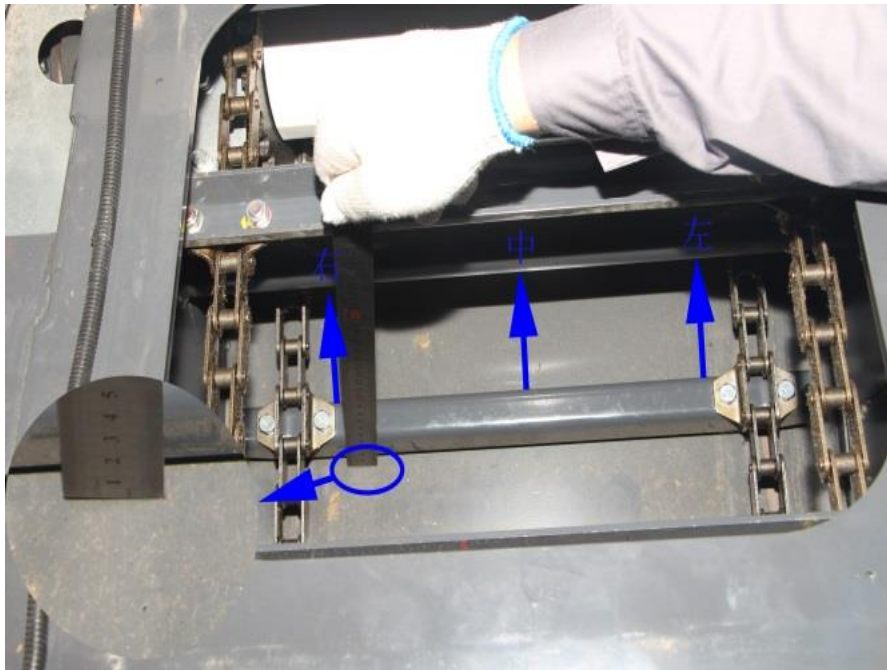
Inspect and adjust clearance between spiral stirrer and base plate (reference value: 8~15mm, may differ slightly among different types of crops)



Check the clearance between telescopic rods and base plate

3.3 Maintenance of Rice Harvester Conveying Components

- Full-feed Combine Harvester (middle conveying components)



Clearance between transmission chain plate and base plate (generally 0.5 ~ 2 mm, , may differ slightly among different types of crops)

3.3 Maintenance of Rice Harvester Conveying Components

➤ Semi-feed



Combine



- Chain of crop straighter

a) check if there is any serious deformations, make adjustment if necessary.

Method:

- (1) remove connecting ring joint;
- (2) remove chain link for adjustment.

- Check the clearance among tension hooks, and nut hooks (reference value: 0.5~2.5mm), make adjustment if necessary.

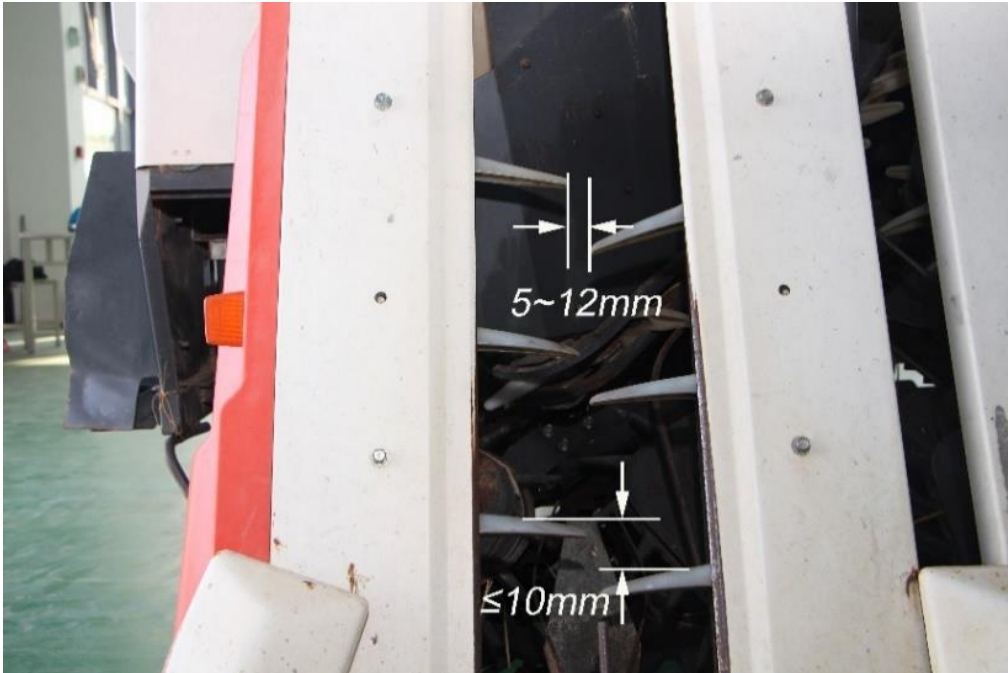
Method:

- (1) Loosen tension spring lock nut;
- (2) make adjustment by adjusting the nut;

Remove link joint for adjustment if there is no enough allowance.

3.3 Maintenance of Rice Harvester Conveying Components

➤ Semi-feed Combine Harvester



Clearance concerning straighter teeth

Check height difference between teeth rows (reference value: 70~110mm), height difference from left to right (reference value: $\leq 10\text{mm}$), top clearance (reference value: 5~12mm), difference from front to rear (reference value: $\leq 5\text{mm}$), make adjustment if necessary.

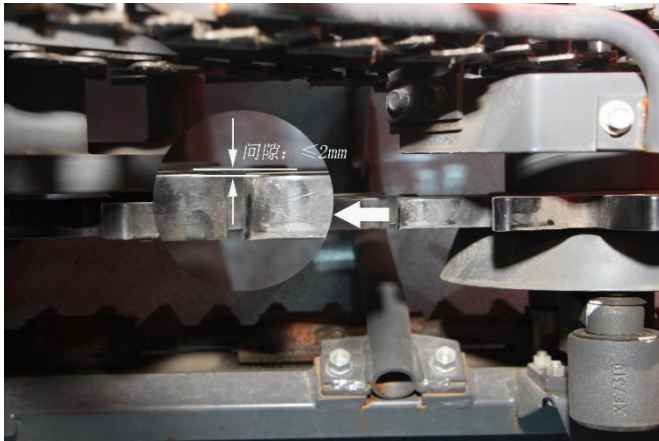
Method:

- (1) generally, right clearance can be achieved by adopting correct installation method;
- (2) if the difference is way off requirement, slip one knot of one of the chains.

If there is excessive top clearance, then the straighter teeth needs to be replaced, it is possibly caused by deformation of the straighter or the bearings. Excessive clearance between front and rear is mainly caused by straighter bearing deformation.

3.3 Maintenance of Rice Harvester Conveying Components

➤ Semi-feed Combine Harvester



- Height difference at the side of feed star wheel
- Check height difference at the side of feed star wheel (reference value: $\leq 2\text{mm}$), make adjustment if necessary.
- Method:
 - (1) Loosen mounting bolts of the feed wheel;
 - (2) Adjust feed wheel to proper position and tighten mounting bolts.

Tension of panicle tip chain

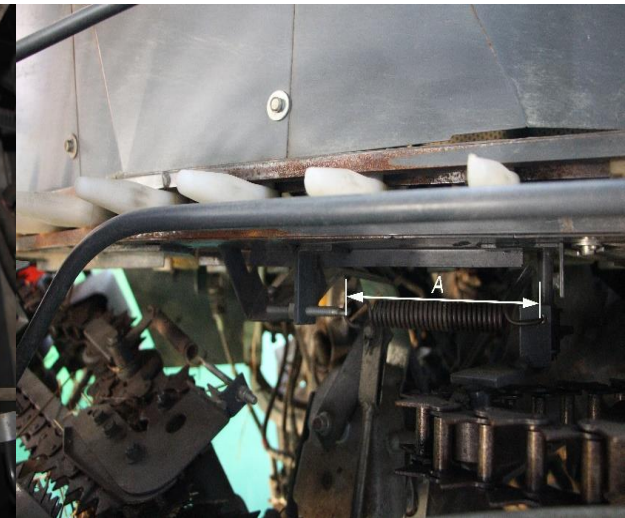
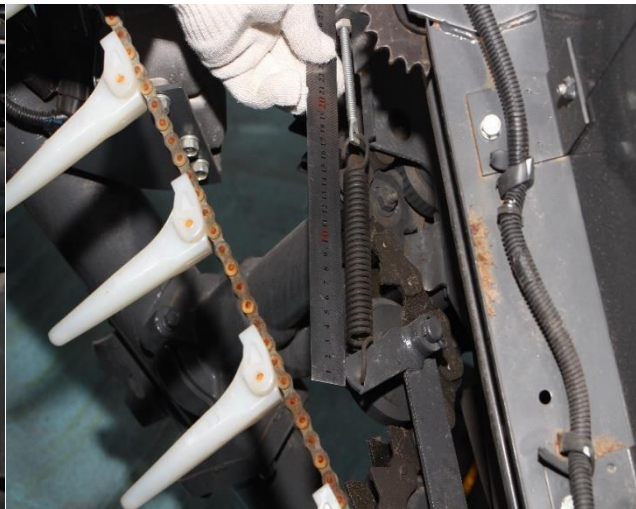
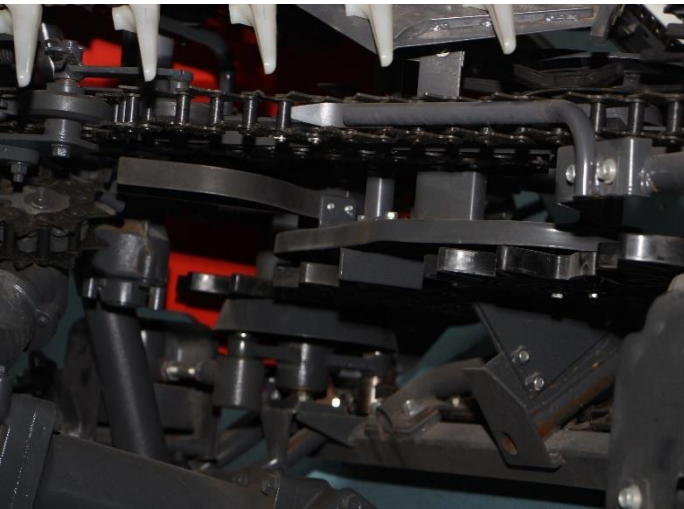
Check chain tension (the chain is automatically tensioned, and it would slightly extend with time), make adjustment if necessary.

Method:

- (1) Loosen mounting nuts at tension set;
- (2) Use tool such as screwdriver, press downward against the tension chain at the L-shaped part of the frame, and then tighten the nuts.

3.3 Maintenance of Rice Harvester Conveying Components

➤ Semi-feed Combine Harvester



- Tension of stem chain

Check the inner dimension of the stem chain spring (reference value: right stem 186~172mm, left stem 140~144mm), make adjustment if necessary.

Method:

- (1) Loosen tension spring, lock the nuts;
- (2) Make adjustments through adjusting the nuts.

- Tension of supply chain

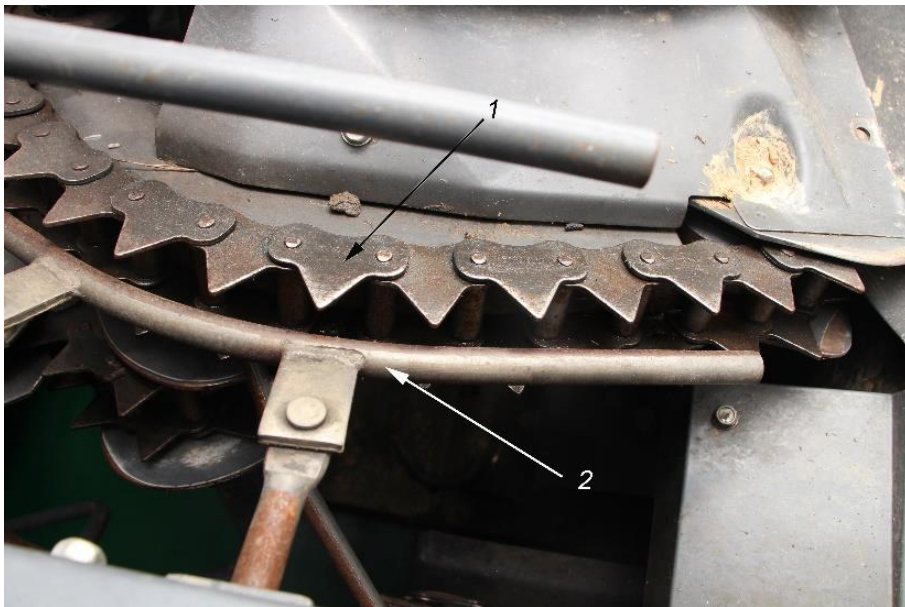
Check inner dimension of supply chain spring (reference value: A), make adjustment if necessary. ◦

Method:

- (1) Loosen tension spring, lock the nuts;
- (2) Make adjustments through adjusting the nuts.

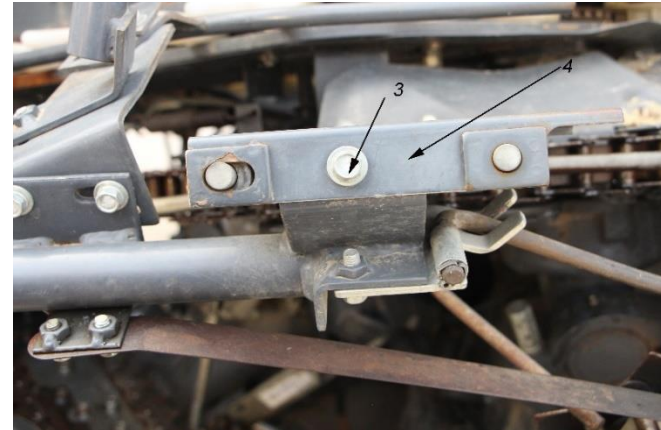
3.3 Maintenance of Rice Harvester Conveying Components

➤ Semi-feed Combine Harvester



1. Stem chain; 2. Supply guide rod

- Clearance between supply chain and guide plate
- Check clearance between supply chain and guide plate (reference value: pin shaft to guide rod 2~8mm, chain plate to guide rod 2~7mm), make adjustment if necessary.



3. Guide rod mounting bolt; 4. Guide bracket

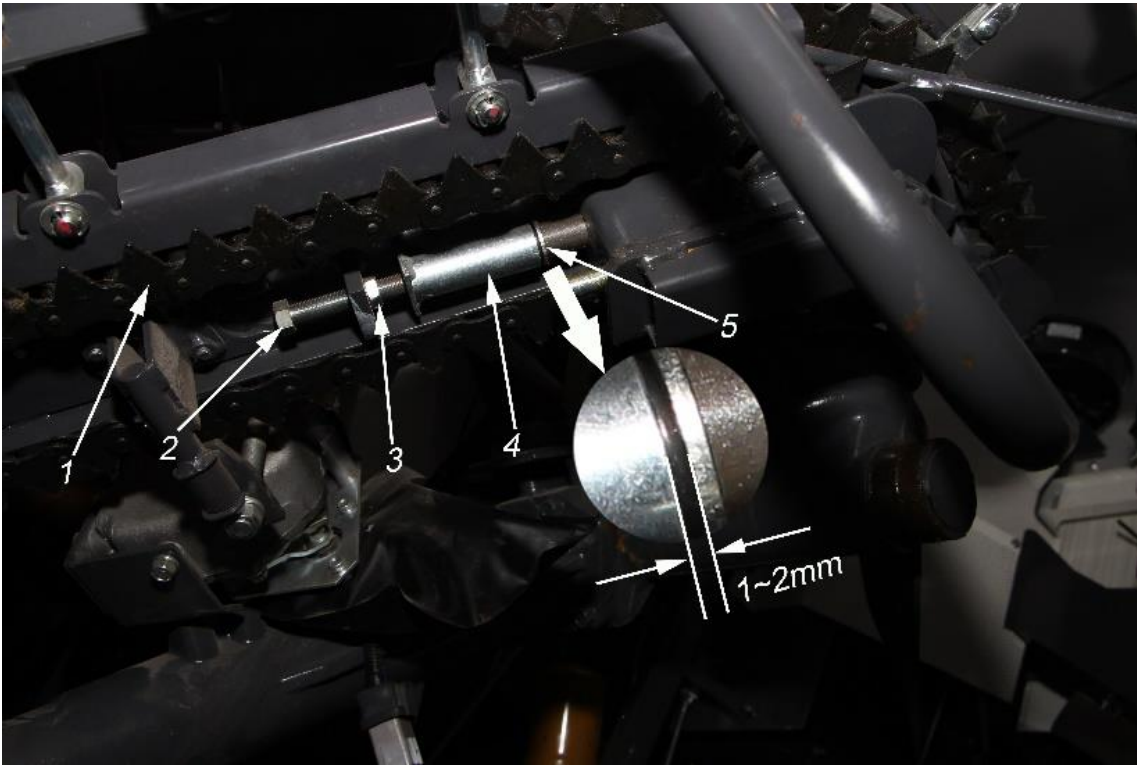
- Method:

- (1) Adjust clearance between chain plate and guide rod by adjusting the mounting bolt at guide bracket;
- (2) Adjust clearance between pin shaft and guide rod by adjusting gasket at guide bracket.



3.3 Maintenance of Rice Harvester Conveying Components

➤ Semi-feed Combine Harvester



1. Depth adjustable threshing chain; 2. adjusting bolt; 3. Lock nut; 4. depth stopper; 5. flat washer

- Tension of depth adjustable threshing chain

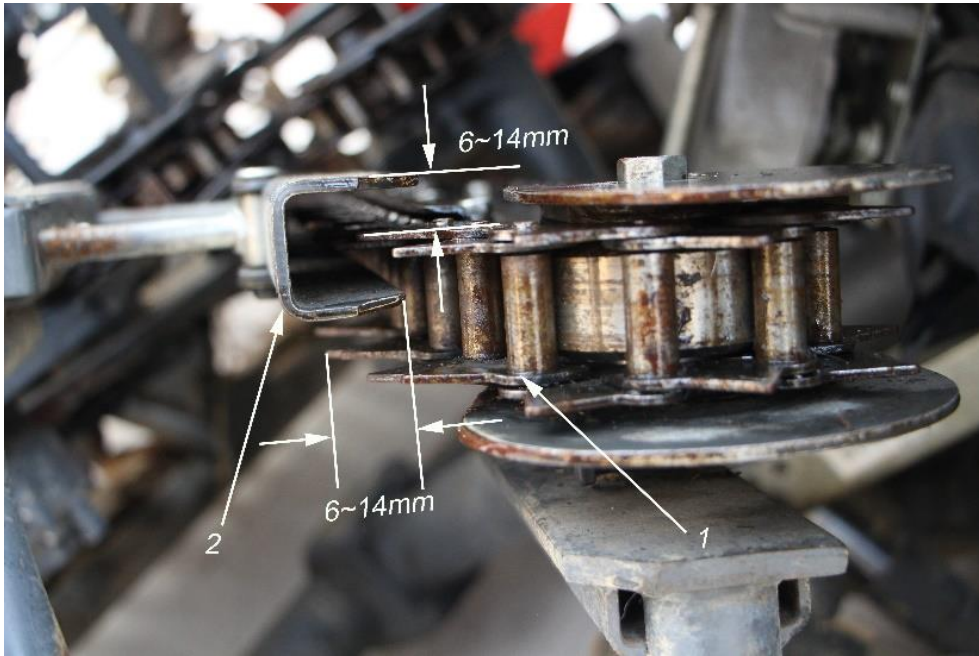
Check the tension of depth adjustable threshing chain (reference value 1~2mm), make adjustment if necessary.

Method:

- (1) Loosen depth adjusting nut;
- (2) Make adjustment by adjusting flat washer at tension arm and threshing depth stopper.

3.3 Maintenance of Rice Harvester Conveying Components

➤ Semi-feed Combine Harvester



1. Depth adjustable threshing chain; 2. guide plate;
3. pin shaft; 4. mounting bolt

- Clearance between depth adjustable threshing chain and guide plate
Check the clearance between depth adjustable threshing chain and guide plate (reference value: 6~14mm), make adjustment if necessary.

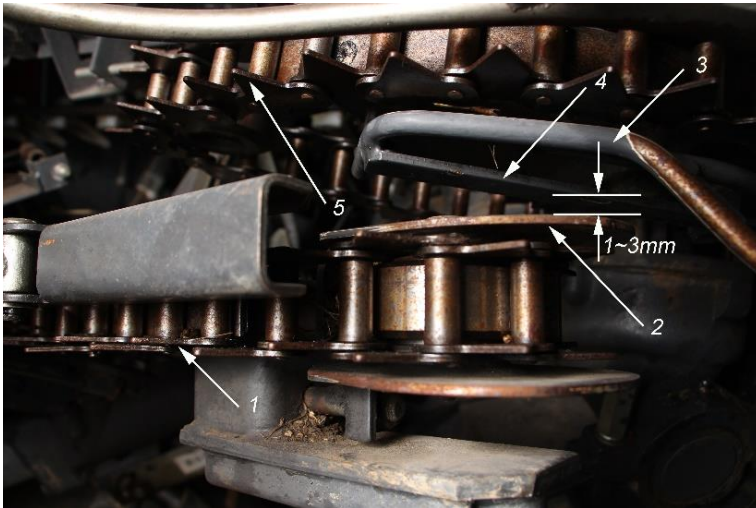
Method:

Make adjustment by adjusting mounting bolt at guide bracket



3.3 Maintenance of Rice Harvester Conveying Components

➤ Semi-feed Combine Harvester



- Clearance between threshing chain plate and supply chain plate

Check the clearance between threshing chain plate and supply chain plate (reference value: 1~3mm), make adjustment if necessary.

Method:

- (1) Place threshing chain at the deepest position;
- (2) Make adjustment through adjusting nut at chain adjusting rod.



1. Threshing chain; 2. chain plate; 3. feed rod;
4. stopper; 5. supply chain; 6. adjusting nut; 7 lock nut; 8. adjusting rod

3.4 Maintenance of Rice Harvester Threshing and Cleaning Components

- Safe operating condition of equipment



- Equipment shall meet operating requirement, safety cover is mandatory

3.4 Maintenance of Rice Harvester Threshing and Cleaning Components



- Replacement of threshing teeth (components (teeth, stem entanglement preventing plate), threshing teeth assemblies need to be replaced in pairs.
- Method:
 - (1) Remove threshing cylinder cover;
 - (2) Remove cylinder inner side nut and then remove threshing teeth;
 - (3) Replace or install new threshing teeth, install cylinder cover back in place.

Carry out dynamic balancing after changing installation direction of stem entanglement preventing plate, or replacing threshing teeth components.

3.3 Maintenance of Rice Harvester Conveying Components

➤ Semi-feed Combine Harvester



1. Depth adjustable threshing chain;
2. supply chain;
3. threshing frame; 4. mounting bolt



- Adjust position of supply chain and depth adjustable threshing chain

Check the top extended length of supply chain and depth adjustable threshing chain plate (reference value: -5~5mm), make adjustment if necessary.

Method:

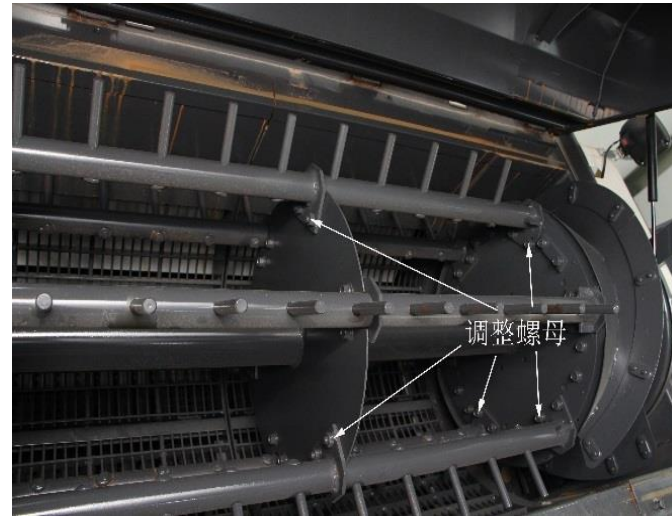
- (1) Place the depth adjustable threshing chain to the deepest threshing position;
- (2) Make adjustment by adjusting the mounting bolt at the threshing frame.

3.4 Maintenance of Rice Harvester Threshing and Cleaning Components

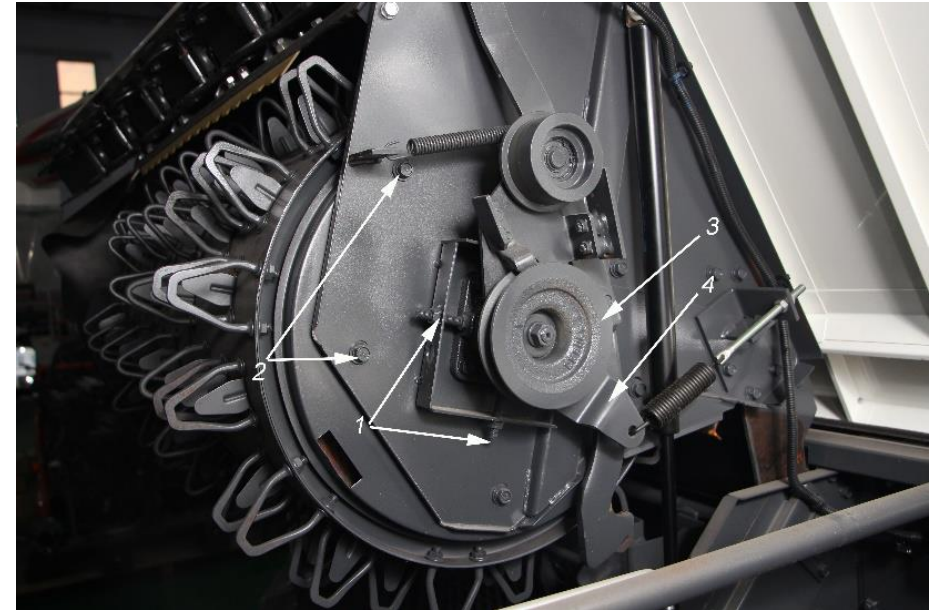
➤ Semi/full-feed Combine Harvester



Check clearance between threshing teeth and sieve



loosen bolts that being used to secure threshing teeth to front, middle and rear threshing cylinder shaft plate



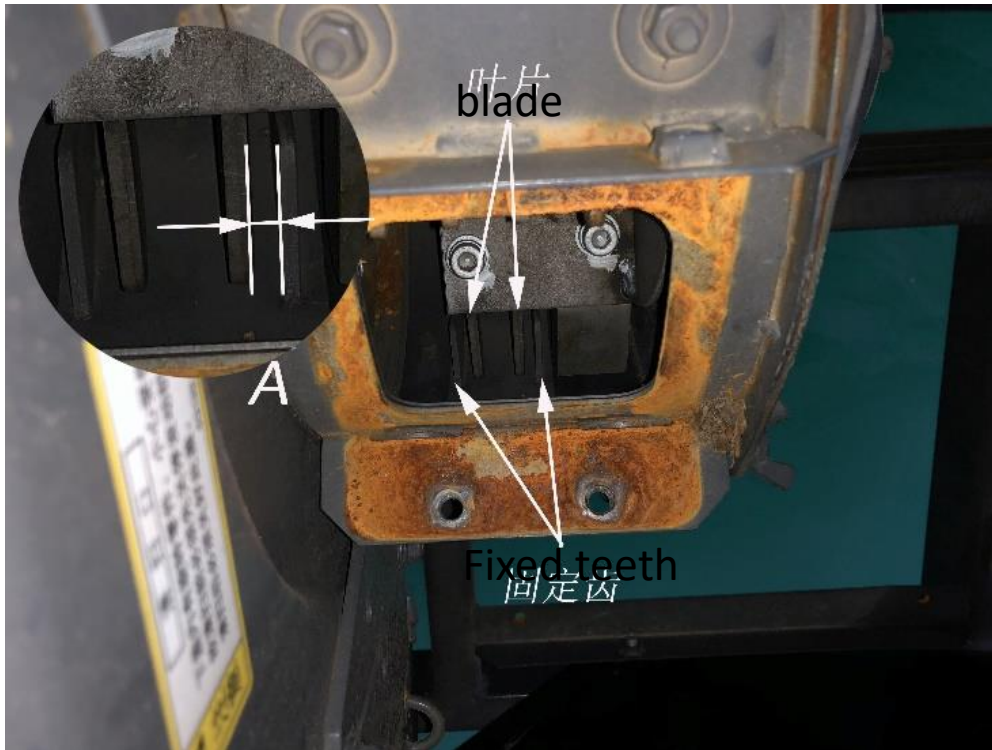
1.Aligning bolts; 2. anchor bolts; 3. driving wheel for stem discharging; 4. tension arm for stem discharging.

- Method:

- (1) Remove cylinder driving belt;
- (2) Loosen anchor bolts and aligning bolts on both sides of the cylinder;
- (3) Make adjustment by adjusting aligning bolts.

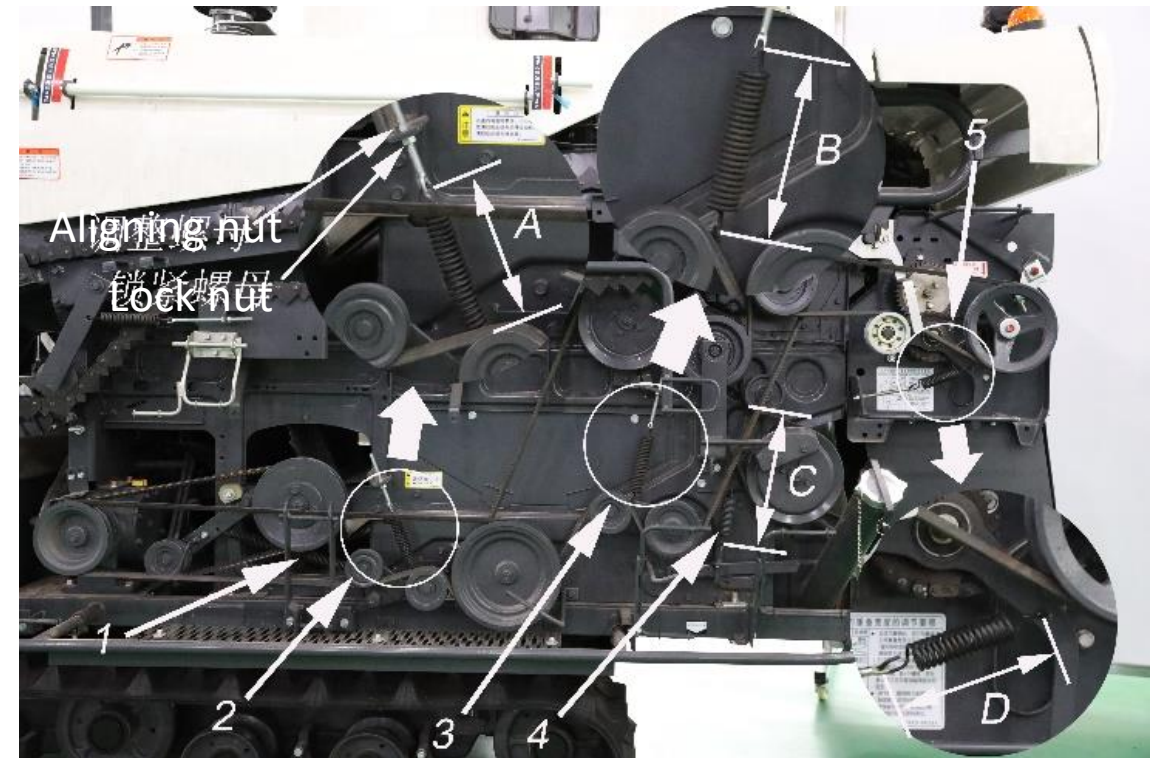
3.4 Maintenance of Rice Harvester Threshing and Cleaning Components

➤ Semi/full-feed Combine Harvester



Clearance check - rethresher

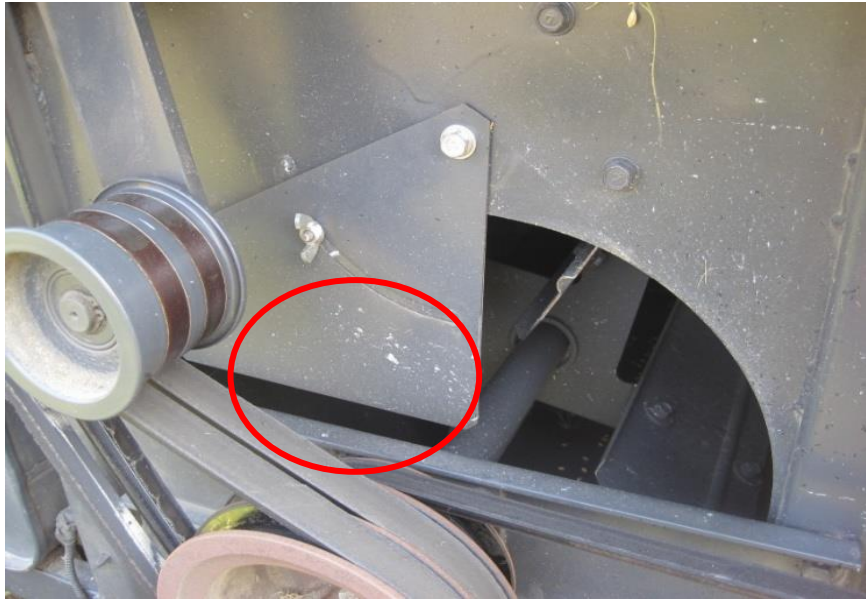
Replace blade with excessive wear and tear



1. Tension spring of cleaning fan driving belt; 2. tension spring of grain spiral driving belt; 3. tension spring of residue spiral driving belt; 4. tension spring of vibrate sieve driving belt; 5. tension spring of cutter driving belt;

3.4 Maintenance of Rice Harvester Threshing and Cleaning Components

➤ Semi/full-feed Combine Harvester



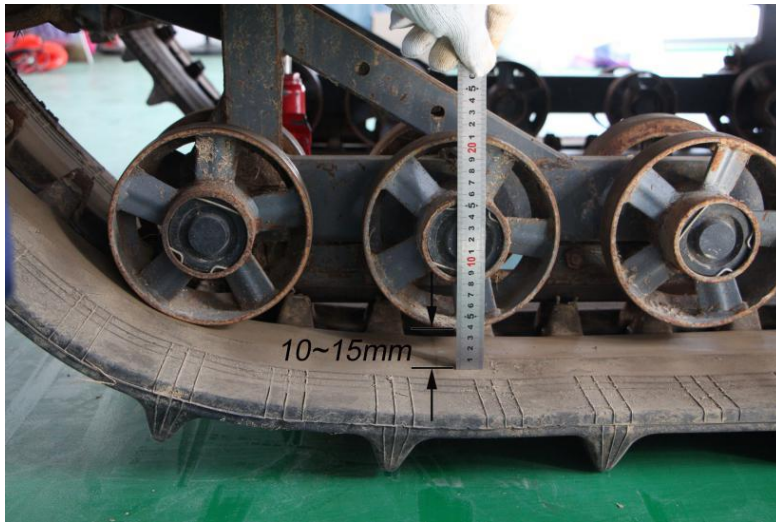
Air blower volume control plate



- Tension of cleaning fan driving belt
cleaning fan driving belt is automatically tensioned; replace tension device or belt when the belt deflection is too large.

3.5 Maintenance of Rice Harvester Driving Components

➤ Inspection and adjustment to the track tension



Check clearance between the 2nd wheel and the track



Check clearance between the 4th wheel and the track



Adjust track tension

3.5 Maintenance of Rice Harvester Driving Components

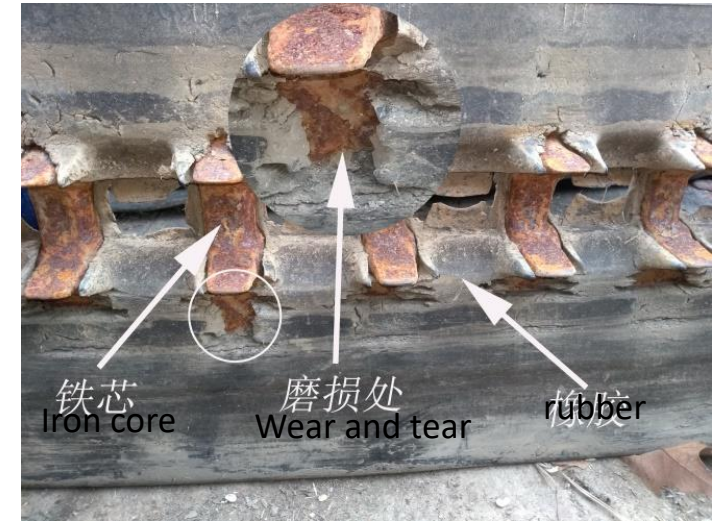
➤ Technical and status inspection of driving system



Check drive wheel

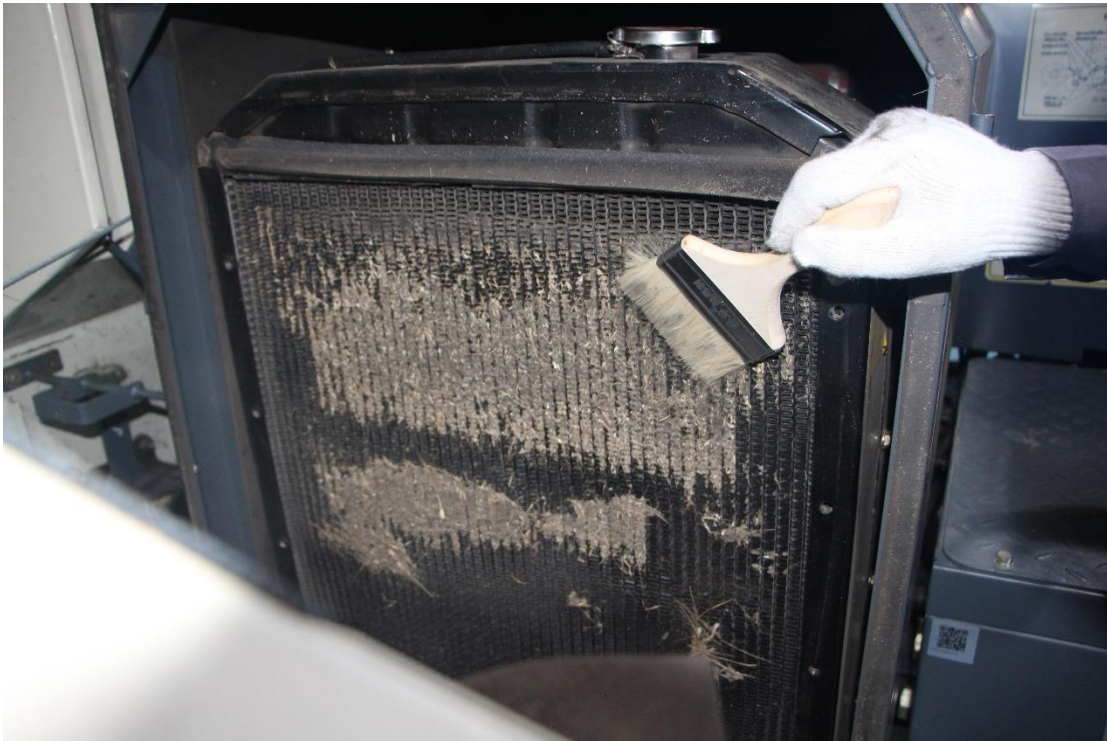


2-15b check track rail



2-15c check track rail

➤ Routine maintenance



engine cleaning

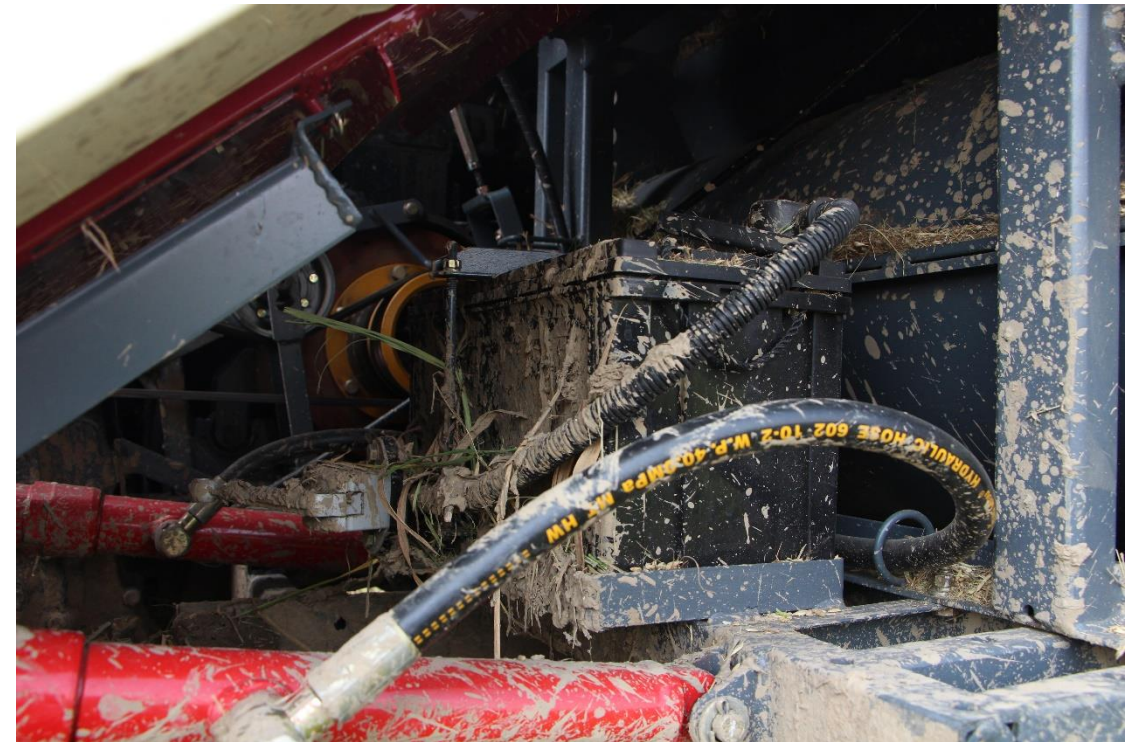


air filter cleaning

➤ Routine maintenance



Driving components cleaning



battery cleaning

➤ Routine maintenance



cutter lubricating

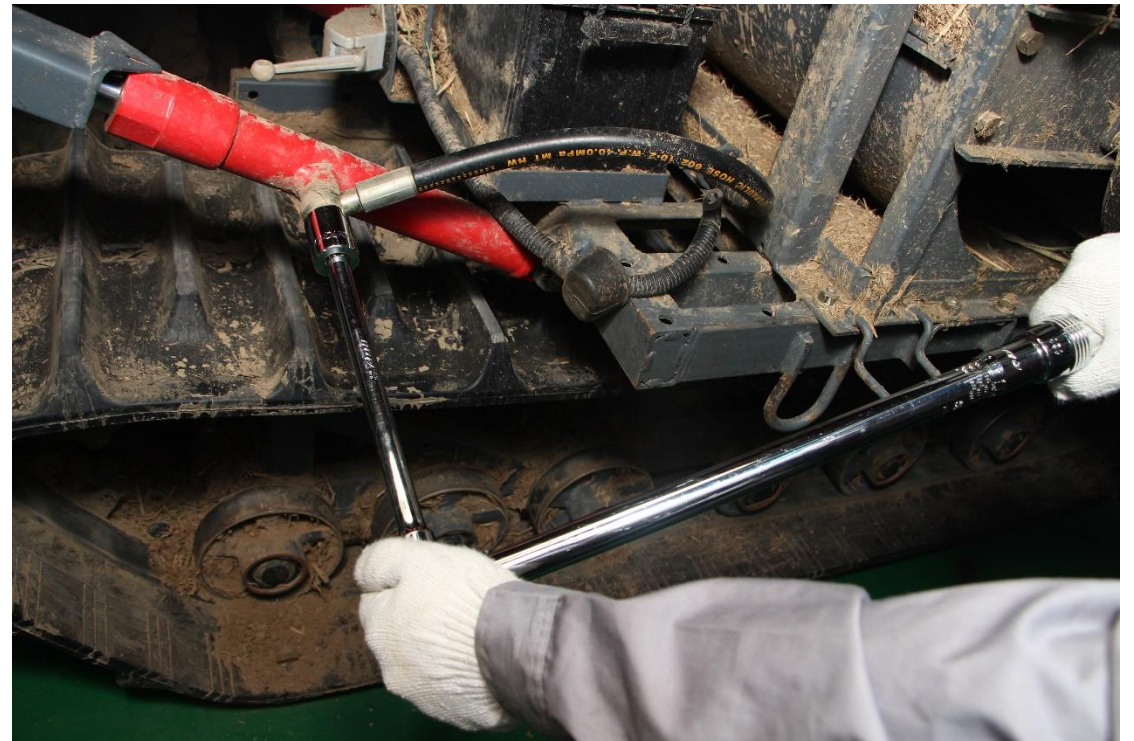


chain lubricating

➤ Routine maintenance



driving wheel bolt fastening



Oil tube bolt tightening

➤ Routine maintenance



Spiral stirrer cleaning



grain discharger cleaning



Thank You



The project is funded by Bill and Melinda Gates Foundation.

