Trakindo CAT

Nomor Formulir / Form Number	SHE.SHE.FRM.005.R04

ANALISIS LINGKUNGAN KESELAMATAN KERJA / JOB SAFETY ENVIRONMENT ANALYSIS

Pekerjaan / Task	R1 flywheel C7	Nomor JSEA / JSEA Number		Halaman / Page	1	Dari / Of	2
Tanggal Pembuatan JSEA / Date of JSEA	6 Desember 2025	Departemen / Dept		Tempat Kerja / Work Location	Workshop TAB		
Disusun Oleh / Compiled By	Vashti	TTD / Sign		Review Oleh / Reviewed By		TTD / Sign	
Atasan / Superior		TTD / Sign					

Apakah Anda sudah terlatih untuk melakukan pekerjaan ini ? / *Are you properly trained to complete these task ?* ☑ Ya / Yes ☐ Tidak / No

Apa yang Anda perlukan untuk memastikan bahwa pekerjaan selesai tanpa adanya kecelakaan kerja ? / *What do you need to ensure this job is completed incident free ?*

Tools yang digunakan sudah sesuai dengan Manual

Siapa yang bertanggung jawab untuk menghentikan pekerjaan jika terjadi perubahan pekerjaan atau gangguan kondisi lingkungan kerja ? / *Who is responsible for Stop Work Authority if change job or workplace distraction could ?*

ABCD-1 (Technician Leader) / Mr. X (Customer)

Apakah Anda memerlukan peralatan LOTO ? / *Are you need LOTO Equipments ?* ☑ Ya / Yes ☐ Tidak / No

Apakah Anda mengetahui ERP/MERP dari pekerjaan yang sedang dilakukan? ☑ Ya / Yes ☐ Tidak / No ***Jika tidak, silahkan tambahkan dalam urutan langkah tugas diawal***

Kondisi Lingkungan / *Environmental Conditions*	Cuaca / *Weather*	Cerah	Medan / *Terrain*	Rata

Pengendalian Sumber Bahaya / *Hazardous Energy Control*					
	☑ Listrik / *Electrical*	☑ Gravitasi (Benda jatuh,tertimpa) / *Gravitation (Falling objects, struck down)*	☑ Pneumatik / *Pneumatic*		
	☐ Hidraulik / *Hydraulic*	☑ Mekanis / *Mechanical*	☐ Panas / *Thermal*		

APD yang diperlukan / *Required PPE*					
	☑ Helm / *Safety Helm*	☐ Pelindung Muka / *Face shield*	☑ Kacamata / *Safety Glass*		
	☑ Sarung Tangan / *Hand Gloves*	☐ Pelindung Pernafasan / *Respiratory Protection*	☐ Perlindungan Kejatuhan / *Fall Protection*		
	☑ Sepatu / *Safety Shoes*	☐ Pelindung Telinga / *Hearing Protection*	☐ Lain-Lain / *Other*		

Hal yang perlu dipertimbangan dalam mengidentifikasi bahaya / *These to consider in identify hazards* :

1 **Bahaya Keselamatan** : Kondisi tidak aman yang dapat menyebabkan injury atau kematian seperti terjepit, terpeleset/terjatuh, tertimpa dll.
Safety Hazard : unsafe conditions that can cause injury or even death, such as spill/falls, pinch point, struck by, etc.

2 **Bahaya Fisik** : Listrik, Api/kedakan, Kebisingan, Radiasi, Panas, Tekanan, Terjepit, Tersandung/Terjatuh, Tertimpa, Getaran.
Physical Hazards : Electrical, Fire/Explosion, Noise, Radiations, Thermal, Pressure, Pinch Point, Slips/Falls, Struck by, Vibration.

3 **Bahaya Kimia** : Terhirup, terkena kulit, injeksi, tertelan, terserap.
Chemical Hazards : Inhalation, skin contact, injection, ingestion, absorption.

4 **Bahaya Biologi** : Patogen yang ditularkan melalui darah, jamur, tanaman/serangga/hewan.
Biological Hazards : bloodbone pathogens, mold, Plant/Insect/Animals

5 **Bahaya Ergonomi** : Gerakan berulang-ulang, beban yang berlebihan, Postur Janggal, Durasi kerja, Desain area kerja.
Ergonomic Hazards : Repetitions, Forcefull extention, Awkward Posture, Duration , Work area desain.

6 **Bahaya Organisasi** : stres atau bahaya terkait dengan masalah tempat kerja yang menyebabkan efek jangka panjang atau pendek, beban kerja yang berat dan kekerasan ditempat kerja.
Organizational hazards: stressors or hazards associated with workplace issues that cause long or short term effects heavy workloads, stressful interactions and workplaces violence.

No	Urutan Dasar Langkah Tugas / *Job Steps* (* *Maksimum 15 Langkah / Maximum 15 Steps*)	Bahaya Yang Terkait / *Potential Hazard(s)*	Tindakan Perbaikan / *Recommended Action*
1.	Walk around inspection.	1.1 Tersandung wood block	1.1.1 posisikan pada tempat yang aman.
		1.2 area kerja sempit	1.2.1 pindahkan posisi engine
2.	Prepare tools	2.1 Tools kotor	2.1.1 Bersihkan tools.
		2.2 Tools rusak	2.2.1 inspect tools terlebih dahulu
3.	Doing remove flywheel	3.1 posisi badan tidak tepat	3.1.1 perhatikan posisi tubuh
		3.2 tangan terjepit komponen	3.2.1 Tetap berhati-hati
			3.2.2 Hindari titik jepit
		3.3 Bolt terpental	3.3.1 Tetap fokus.
		3.4 Kontaminan menempel	3.4.1 Lap kontaminan dg majun.
			3.4.2 Gunakan safety gloves.
4.	Doing wash fastener	4.1 Terpeleset lantai	4.1.1 Bersihkan lantai yg tercecer solar.
			4.1.2 Tetap fokus saat berjalan.
		4.2 Tangan terkena solar	4.2.1 gunakan safety gloves khusus
5.	Doing install flywheel	5.1 komponen tidak pas	5.1.1 perhatikan posisi komponen.
		5.2 tangan terjepit	5.2.1 Hindari titik jepit.
			5.2.2 Tidak bergurau.
		5.3 posisi badan tidak tepat	5.3.1 posisikan badan sesuai ketentuan.
			5.3.2 Gunakan APD

Bagian Dari / Part Of	SHE.SHE.SOP.003.R04

Trakindo CAT

Nomor Formulir / Form Number	SHE.SHE.FRM.005.R03

ANALISIS LINGKUNGAN KESELAMATAN KERJA / JOB SAFETY ENVIRONMENT ANALYSIS

Pekerjaan / *Task*		Nomor JSEA / *JSEA Number*		Halaman / *Page*	2	Dari / *Of*	

No	Urutan Dasar Langkah Tugas / *Job Steps*	Bahaya Yang Terkait / *Potential Hazard(s)*	Tindakan Perbaikan / *Recommended Action*
6.	House keeping	6.1 Tersandung komponen / kabel	6.1.1 Bersihkan dan letakkan ditempat aman.
		6.2 Komponen berdebu	6.2.1 bersihkan dg whitetowel

Bukti sosialisasi / *Evidence of socialization* :

No	Nama / *Name*	TTD / *Sign*
1		
2		
3		
4		
5		

No	Nama / Name	TTD / Sign

No	Nama / Name	TTD / Sign

SMCS - 1156 I02743771

Removal Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	138-7575	Link Bracket	1
B		Forcing bolts M16 - 2 by 120 mm	2

Start By:

a. Remove the crankshaft position sensor. Refer to Disassembly and Assembly, "Crankshaft Position Sensor - Remove and Install".

b. Remove the muffler. Refer to Disassembly and Assembly, "Muffler - Remove and Install".

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

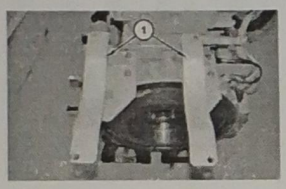


Illustration 1 g01374966

1. Remove muffler brackets (1).

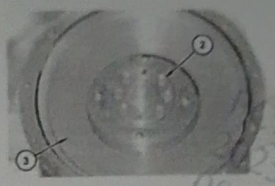


Illustration 2 g01374968

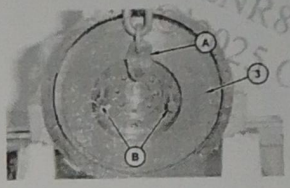


Illustration 3 g01374970

2. Remove bolts (2).

3. Install Tooling (A) and a suitable lifting device onto flywheel (3).

4. Use Tooling (B) in order to remove flywheel (3) out of the housing. The weight of flywheel (3) is approximately 50 kg (110 lb).

5. Perform the following procedure in order to remove the flywheel ring gear.

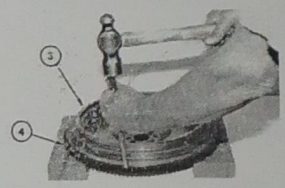


Illustration 4 g01374977
Typical Example

a. Place flywheel (3) and ring gear (4) on suitable cribbing.
Note: Mark the orientation of ring gear (4) on flywheel (3) for assembly purposes.

⚠ WARNING

Always wear protective gloves when handling parts that have been heated.

b. Raise the temperature of ring gear (4) uniformly.

c. Remove the ring gear (4) by tapping ring gear (4) all the way around flywheel (3).

d. Reposition flywheel (3) in order to remove ring gear (4).

PCP-00022950
2025/12/10
08:05:53+07:00
I02743771
© 2025 Caterpillar Inc.

SMCS - 1156

i02744399

Installation Procedure

Table 1

Required Tools			
Tool	Part Number	Part Description	Qty
A	138-7575	Link Bracket	1

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

⚠ WARNING

Always wear protective gloves when handling parts that have been heated.

1. Perform the following procedure, if the ring gear was removed from the flywheel.
   a. Raise the temperature of the ring gear 149 °C (300 °F).
   b. Use a suitable press in order to install the ring gear onto the flywheel.
   Note: Prior to the installation of the flywheel, refer to Specifications, "Flywheel" for information on checking the flywheel assembly for flatness.

Illustration 1 g01374967

2. Install Tooling (A) and a suitable lifting device onto flywheel (3).
3. Install flywheel (3). The weight of flywheel (3) is approximately 50 kg (110 lb).

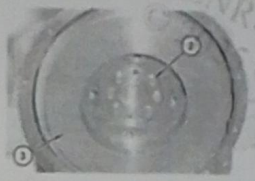


Illustration 2 g01374968

4. Install bolts (2) in order to secure flywheel (3) onto the crankshaft. Tighten bolts (2) to a torque of 83 ± 5 N·m (61 ± 4 lb ft).
5. Remove Tooling (A) from flywheel (3).

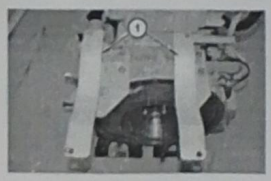


Illustration 3 g01374966

6. Install muffler brackets (1).
7. Check the flywheel runout. Refer to Testing and Adjusting, "Flywheel Housing - Inspect" for more information on flywheel runout.

End By:

a. Install the muffler. Refer to Disassembly and Assembly, "Muffler - Remove and Install".

b. Install the crankshaft position sensor. Refer to Disassembly and Assembly, "Crankshaft Position Sensor - Remove and Install".

PCP-00022950
2025/12/10
08:06:23+07:00
i02744399
© 2025 Caterpillar Inc.

23/04/2015 **Flywheel - Install (RENR9218-14)**

SMCS - 1156 i06149434

Installation Procedure

Table 1

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	439-3938	Link Bracket	1
B	-	Guide Bolt (M12 X 1.75 by 120 mm)	1
C	9S-3263	Thread Lock Compound	1

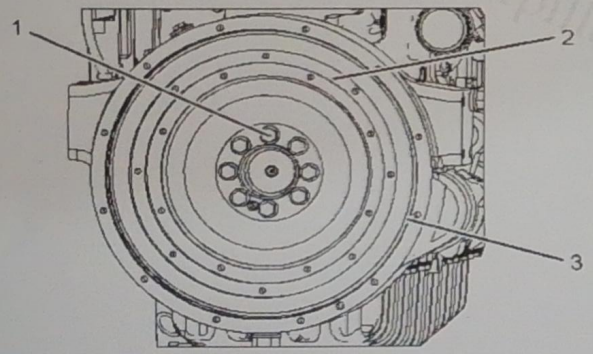
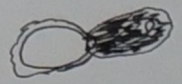


Illustration 1 g01152630

1. Raise the temperature of ring gear (3).
   Note: Do not use a torch to heat the ring gear.
2. Position ring gear (3) on flywheel (2) with the part number toward the crankshaft. Use a soft hammer in order to seat the ring gear against the shoulder of the flywheel. Allow the ring gear to cool.
3. Install Tooling (B) in the crankshaft.

4. Attach Tooling (A) and a suitable lifting device to flywheel (2). The weight of flywheel (2) is approximately 27 kg (60 lb).
5. Position flywheel (2) on Tooling (B).
6. Apply Tooling (C) to the threads of bolts (1).
7. Install bolts (1). Remove Tooling (B) and install remaining bolt (1). Tighten bolts (1) to a torque of 120 ± 20 N·m (89 ± 15 lb ft).
8. Check the flywheel runout. Refer to Testing and Adjusting, "Flywheel - Inspect".

PCP-00022950
2025/12/06
04:49:13+07:00
i02301741
© 2025 Caterpillar Inc.