

openreach

ISIS practice
For Openreach and Partners

EPT/UGP/B009

Issue 27, 30-Aug-2022
Use until 30-Aug-2024

Published by Technical Documentation - Openreach

Privacy- None

Removal & Replacement

of Footway Jointing Chamber Covers

About this document ...

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Content approval

This is the Issue 27 of this document.

The information contained in this document was approved on 30-Aug-2022
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Version History

Version No.	Date	Author	Comments
Issue 27	30-Aug-2022	Carl Morrell	Section 2.1
Issue 26	01-Jul-2022	Carl Morrell	Section 5 image
Issue 25	10-May-2022	Carl Morrell	Update to privacy and audience
Issue 24	04-May-2022	Carl Morrell	Section 3 advice
Issue 23	25-Mar-2022	Carl Morrell	Section 3 update
Issue 22	01-Feb-2022	Carl Morrell	Link updated
Issue 21	22-Feb-2021	Carl Morrell	Section 6 updated
Issue 20	28-May-2020	Carl Morrell	Section 8 update by Jim Dix
Issue 19	01-Nov-2019	Carl Morrell	KJB4 refs removed
Issue 18	22-May-2017	Chief Engineer's Office Technical Documentation Team	Approver update
Issue 17	11-Jun-2015	Chief Engineer's Office Technical Documentation Team	Removal of reference to pulling in section 8
Issue 16	03-Mar-2015	Document Manager T	Document migrated onto new platform with no content change
Issue 16	13-Dec-2011	Chief Engineer's Office Technical Documentation Team	Section 1 and 17 now reference to SFY/HSH/C008 (1460 AT)
Issue 15	14-Dec-2010	Chief Engineer's Office Technical Documentation Team	Document reviewed. Section 3 revised. (DCC1136PD)
Issue 14	8-Dec-2010	Chief Engineer's Office Technical Documentation Team	Section 3 updated. DCC - AEC-B020/SH refers.
Issue 13	21-Apr-2010	Chief Engineer AEI Technical Documentation team	Updated Section 8.5 & References. DCC728/SH
Issue 12	17-Aug-2009	Chief Engineer AEI Technical Documentation team	Document reviewed. Change of author and approver (DCC364)
Issue 11	6-Oct-2008	Murray Hayes	Section 4 updated with eye protection

Issue 10	24-Oct-2006	Murray Hayes	Reference to Engineering Safety Guides removed from section 17
Issue 9	11-Sep-2006	Murray Hayes	Removal of reference to ESG 5
Issue 8	27-Apr-2004	Murray Hayes	Change of owner
Issue 7	10-Dec-2003	Jim Battman	Change of Author/Approver
Issue 6	1-Feb-2002	Keri Thomas	Amendment to detail in Fig. 10. HSC/COP/A002 identified in Introduction
Issue 5	27-Mar-2001	K P Thomas	Amended detail in figure 11

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1 *Introduction*

Note: Obligatory Paragraphs

All manual handling activities are covered by the Manual Handling Operations Regulations 1992 under which employers have a duty to assess activities which may present a risk of injury. Following such an assessment this ISIS describes the safe system of work which has been devised to reduce the risk of injury to BT people who are involved in removal and replacement of footway type jointing chamber covers.

From 1 August 1997 all new frames and covers used in the footway were manufactured to the requirements of BS EN124 class B125 with a load bearing capacity of 125kN. As these new frames and covers were manufactured with an increased load bearing capacity, Frames and Covers, Driveway, Type 'C' were made obsolescent. Refer to EPT/UGP/B014.

This Practice describes methods of handling footway type jointing chamber covers. Also included are the methods to be used when removing and replacing Covers, Driveway, Unit Type Light; Covers, Carriageway 4, Covers Precinct and Covers, Temporary, Reinforced Concrete.

Note: For situations where cover removal cannot be achieved using the following standard practices, the site must be assessed.

2 *Gas Precautions*

The initial test of the gas test procedure **must** be carried out as soon as practicable during the cover removal operation.

SFY/HSH/D050 - Health & Safety Handbook - Gas Precautions, Section 5 describes gas test procedures in detail.

2.1 **Removing lids for gas testing**

In order to properly be able to test an underground structure for gas **all** of the covers must be removed. This provides the maximum level of ventilation to the structure to clear any lighter than air gases and allows the greatest level of un-restricted access to duct lines feeding the structure for testing.

Once the gas testing has been completed, and where the onsite risk assessment or working practice require, covers can be replaced to reduce the overall size of a work site or to provide support to work equipment i.e. the winch lightweight steady legs. When a cover is replaced for these reasons, the following must be complied with –

- Only 1 cover on a multi cover structure can be replaced.

- The replaced cover must not interfere with access to any wall step provided for access/egress.
 - A GDU must be positioned as a sentinel just under the replaced cover as close to the surface as possible.
- Where personnel are working in the structure and positioning the GDU in this way means that there will be no monitoring of the breathing zone a second GDU will be required or the cover can not be replaced.
- The replaced cover must not interfere with any of the planned work activities.

3 ***Frozen and Tight-Fitting Covers***

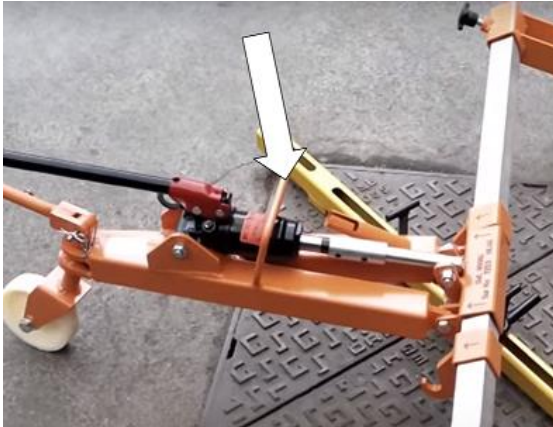
When a cover of any type becomes frozen into the frame or the keyholes become obstructed by ice, **you must thaw the ice** by using a solution of warm water and De-icing salt (I/C 000959). The solution of warm water and salt should be made up by adding 1 kg of salt to 5 litres of warm water. Engineers driving vans where it is not possible to heat water should use Solution De-Icer 1A (I/C 072342) a bottle of which contains 5 litres.

Warning: Under no circumstances should an attempt be made to loosen the covers by any means which involve a naked flame or by using hammers, picks or any other tools which may cause sparks.

If it is necessary to use LMC4, follow these practices.

Reminder for using manhole lifters

- You must keep your hands away from the hydraulic ram area once assembled.
- Do not hold onto the transport handle directly above the lifter ram – it's for carrying only.
- Only use one hand on the operating lever.
- You should always wear the correct PPE – safety boots, goggles, and suitable gloves (e.g. Showa water proof gloves).



What to look out for

The manufacturers of the Lifter Manhole Cover 4s (LMC4), TW Engineering, have created a short video to show best practice for using a lifter, keeping hands away from the hydraulic ram.

The hydraulic ram is shown in this image below - can't see it? [View the image here.](#)



Reminder for anyone that uses a manhole lifter

- Only use equipment if you are trained and competent.
- Wear the correct PPE – safety boots, goggles, and suitable gloves (e.g. Showa water proof gloves).
- If your lifter is defective, or you have any concerns, stop work. Let your manager or patch lead know. Take the lifter out of service and return to esiTest for inspection.
- Don't use lifters outside of their test date – check the lifter's date label or on the esiTest system. If out of test date, make an appointment to have it checked.
- Fully check every component before use – look for any signs of:
 - o wear and tear (e.g. cracks or splits)
 - o leakage (e.g. hydraulic fluid)
 - o damage (e.g. any burrs or misshaped parts)

- Check that every clip is present in the handle and ram assembly.
- Don't tamper with any of the pre-set pressure settings.
- Keep your hands away from the hydraulic ram area, once assembled. Only use one hand on the operating lever. The handle on the main body of the unit is for carrying it, not for holding while in use.
- Only use the supplied lever for operating the hydraulic pump. Listen for any unusual noises from the lifter when in operation.
- Don't over stress the hydraulic pump when in use. If you get to the maximum height, stop pumping the lever. Continuing may cause the pump to fail and possibly cause injury to the user or damage to the equipment.
- To correctly break the seal on Elkington covers, use ram handle 1a (item code 126649) on these oblong covers.

4 ***Protective Clothing***

You **must** wear Gloves Leather (or Gloves PVC if wet) and protective footwear when you are engaged in removing or replacing covers as described in this document. Suitable eye protection **must** be worn when using the lifter manhole No. 4.

5 ***Tools Used to Remove and Replace Footway Type Covers***

- Lifters, Manhole Cover 4A or 4B (Item Code 129356) together with Lifter, Manhole Cover, Part 5 (Item Code 126968)
- Key, Joint Box 5 (Item Code 129320) together with Cover Roller (Item Code 129274)
- Key, Joint Box 3 (Item Code 126475)



6 ***Safety Precautions***

1. Ensure key is in sound condition with no wear, damage or deformation
2. Ensure keys are properly located
3. The whole of the worksite must be fully enclosed using barriers. The “worksite” to include any/ all tools, equipment. For instance box lids, lifters, pumps, blowers etc . For additional guidance refer to Safety at Streetworks & Roadworks code of practice.
4. Always follow the principles of safe lifting. These are detailed in SFY/HSH/C006 - Health and Safety Handbook - Manual Handling Section 4

Warning: Remember your gas precautions. See Paragraph 2.
Never try to loosen a cover by any means which involves naked flames or by using hammers, picks, or any other tools which may cause sparks.

7 ***Removal and Replacement of Covers Using the Lifter, Manhole Cover 4***

The Lifter, Manhole Cover 4 (LMC4) see Figures 1.1 and 1.2 together with Lifter, Manhole Cover Part(s) 5, may be used to remove and replace any footway type cover (See Figures 1.3 and 1.4).

7.1 **Lifter Manhole Cover 4A - Assembly**

1. Slide centre box (G) onto the main beam (I) securing it in a central position using the securing screw (H).
2. Slide the hook boxes (F) onto the main beam placing one box on each side of the centre box.

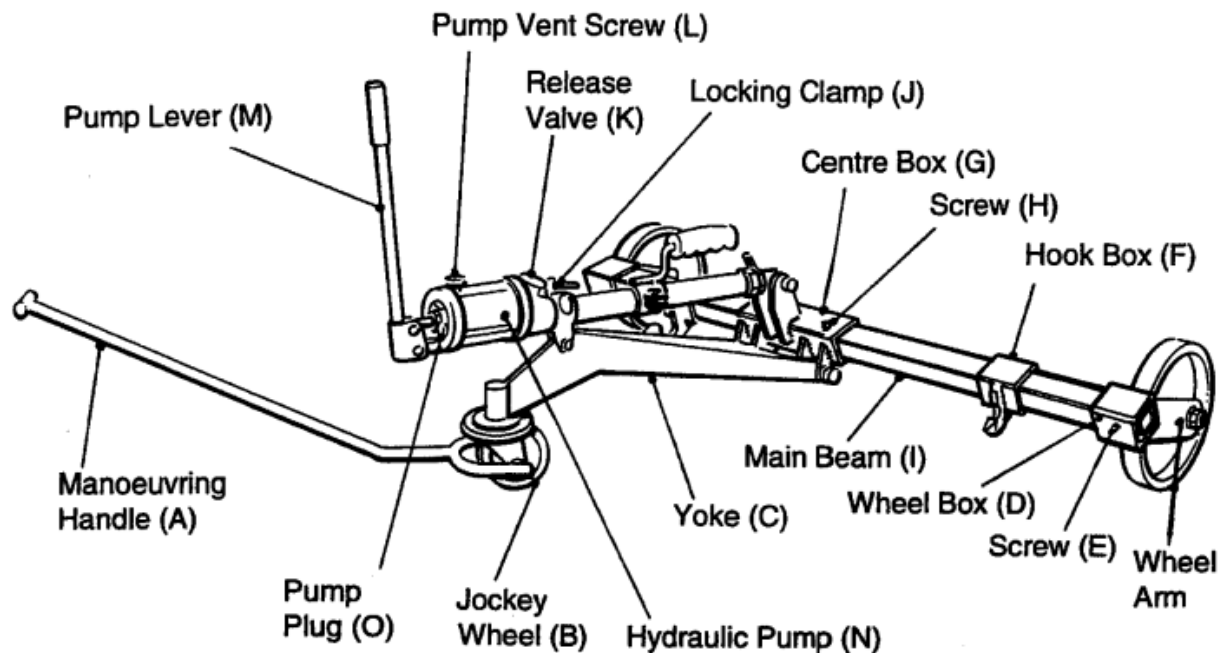
Note: 1. Slide the wheel boxes (D) onto each end of the main beam and secure using the securing screws (E).

Note: 2. It is important that the Items D, F and G are placed on the main beam in the correct attitude to each other ensuring the hooks on the hook box are facing the jockey wheel and wheels facing forward of the beam(see Figure 1.1).

3. Connect the hydraulic pump (N) to the narrow end of the yoke (C) using the bolt and stiff nut. Do not overtighten the stiff nut as this will prevent the pump clamp (J) from pivoting on the yoke.

4. Using the drop-end bolts, attach the broad end of the yoke and the piston of the pump to the lower and upper brackets of the centre box respectively.
5. If required, add hydraulic fluid as necessary through the filler plug (O) with the pump in the vertical position.
6. Attach the manoeuvring handle (A) to the bracket holding the jockey wheel (B) and secure by screwing the adjustable pins into either side hole on the bracket.

Figure 1.1 - Lifter, Manhole Cover 4A



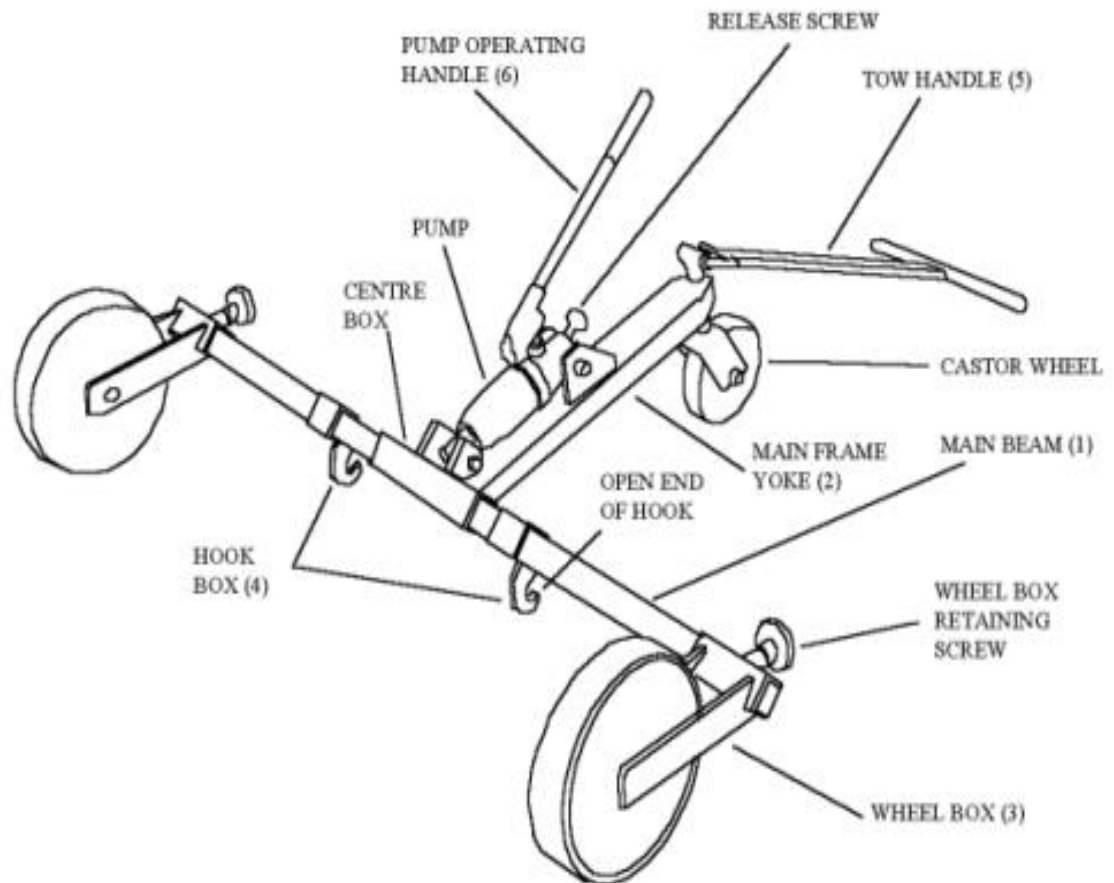
7.2 Lifter Manhole Cover 4B - Assembly

1. Insert the main beam (1) into the main frame yoke assembly (2).
2. Slide the hook boxes (4) onto the main beam - **ensure the open end of the hook(s) face towards the pump** on main frame yoke.
3. Slide the wheel boxes (3) onto the main beam placing one box on each side of the main frame yoke and secure using retaining screw clamp - ensure the wheels face forward of the beam.
4. Locate pump operating handle (6) into pump body and attach the manoeuvring handle (5) to the bracket of the jockey wheel and secure with the 'R' clip.

Note: 1. If additional lift is required to remove or replace a cover, the wheels can be fitted to the holes at the extreme end of the wheel arms. If the lifter is being stored/carried as a kit of parts then wheels can be left in this position. Where

the lifter is being carried/stored as a complete unit in its dedicated storage position at the rear of the vehicle (Transit 581) the wheels will have to be repositioned to allow its correct storage.

Figure 1.2 - Lifter Manhole Cover 4B



SEE NOTE 1 OF ASSEMBLY INSTRUCTIONS

7.3 Lifter Manhole Cover 4 - Inspection

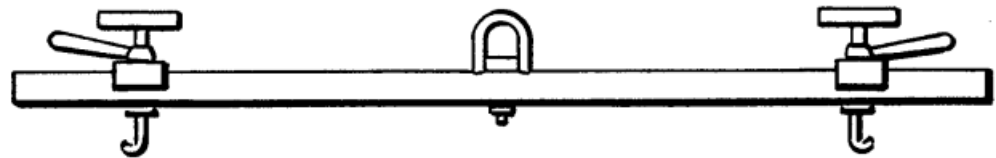
Before using the LMC4A or B check the following:

1. Ensure all the parts are fitted and assembled correctly, refer to Figures 1.1 and 1.2
2. Check parts for wear or damage

3. Operate the pump lever to ensure that the main beam assembly can be fully raised - With the main beam in the raised position operate the pump release valve to ensure the main beam can be lowered
4. Visually check the hydraulic pump assembly for any signs of leaks
5. If faulty remove from service

7.4 Using Lifter, Manhole Cover 4A Part 5B

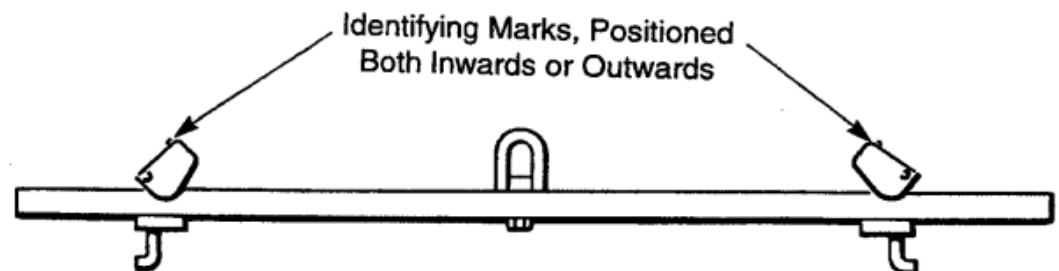
Figure 1.3 - Lifter, Manhole Cover Part 5B



Insert the tangs of the keys into the keyholes of the cover to be lifted. Turn each key through 90 degrees to ensure that the tangs of the keys locate on the underside of the keyhole recess. Ensure that the keys are equally spaced on the lifting bar. Tighten the winged nuts.

7.5 Using Lifter, Manhole Cover 4A Part 5C

Figure 1.4 - Lifter, Manhole Cover Part 5C



Raise both key locking mechanisms to allow keys to rotate freely. Insert the tangs of the keys into the keyholes of the cover to be lifted. Turn each key through 90 degrees to ensure that the tangs of the keys locate on the underside of the keyhole recess. Ensure that the keys are equally spaced on the lifting bar, secure keys by closing locking mechanisms ensuring that the marks on the top of the mechanism are either both facing inwards or outwards (see Figure 1.4).

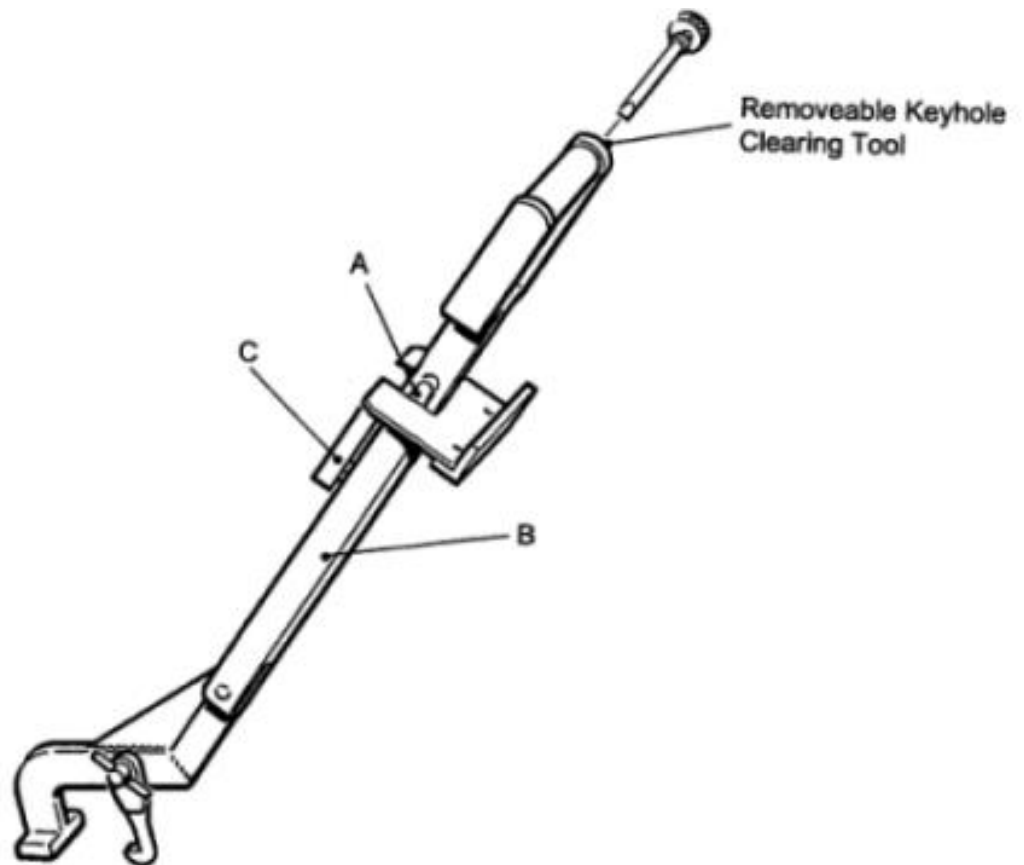
7.6 Using Lifter, Manhole Cover 4

1. Engage the keys of the Lifter, Manhole Cover Part(s) 5 in the keyholes of the cover to be removed as detailed above

2. Position the lifter over the cover, open the Release Valve (and Pump Vent Screw on 4A only) and return the ram fully home in the cylinder
3. Engage the hook(s) on the lifter into the lifting key loop(s) by moving the hooks along the beam (and adjusting the Cylinder Locking Clamp on the 4A only)
4. Make sure that the Cylinder Locking Clamp is secure (4A only) and that the Release Valve is closed
5. Operate the Pump Lever until the cover is raised from the frame
6. Pull the cover clear of the frame and then lower it onto the surface by opening the Release Valve
7. To replace the cover - reverse the above procedures
8. After use, close the Pump Vent Screw (4A only)

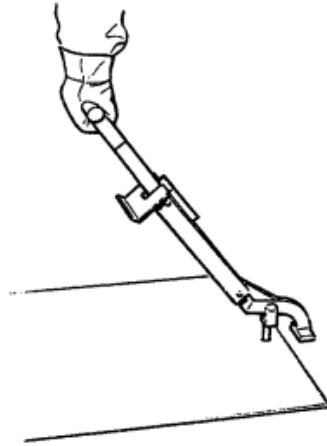
8 *Removal and Replacement of Covers Using a Key, Joint Box 5*

The Key, Joint Box 5 (see Figure 2) carries 2 arm attachments which are stowed along the key shank and retained by a spring catch (A). The rearward arm is identified as the drop-down foot (B). The forward arm is identified as the counterbalance mechanism (C).

Figure 2 - Key, Joint Box 5

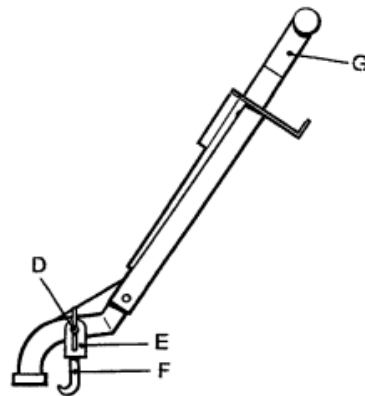
The necessary safe handling procedures and attendant precautions for removing and replacing footway type jointing chamber covers using a Key, Joint Box 5, are set out below: See also Paragraph 6.

1. Providing the frame is set in and reasonably level with flat firm surrounding area, one person can safely deal with any footway type cover - Only exceptionally, where one person procedures are not practicable, for example on a pathway under construction, will two people be required
2. The principles for safe lifting (SFY/HSB/C006) **must** always be followed - Use unhurried movements
3. Do not resort to gripping a cover by the edges in order to manipulate it
4. Check cover type and clear the key hole
5. Under no circumstances attempt to remove a cover without first making sure that the seal between the cover and frame has been broken - This is done by using the Key in the reverse position in one or more keyholes as necessary as shown in Figure 3

Figure 3 - Breaking the Seal

Note: For 'A' type covers only (see Paragraph 8.1): to break the seal, Key, Joint Box 5 must first be modified as follows

Reverse the lifting tang. Unscrew and remove the screwed pivot (D), remove and reverse part (E) such that the tang (F) is facing the handle (G). Replace the screwed pivot (D).

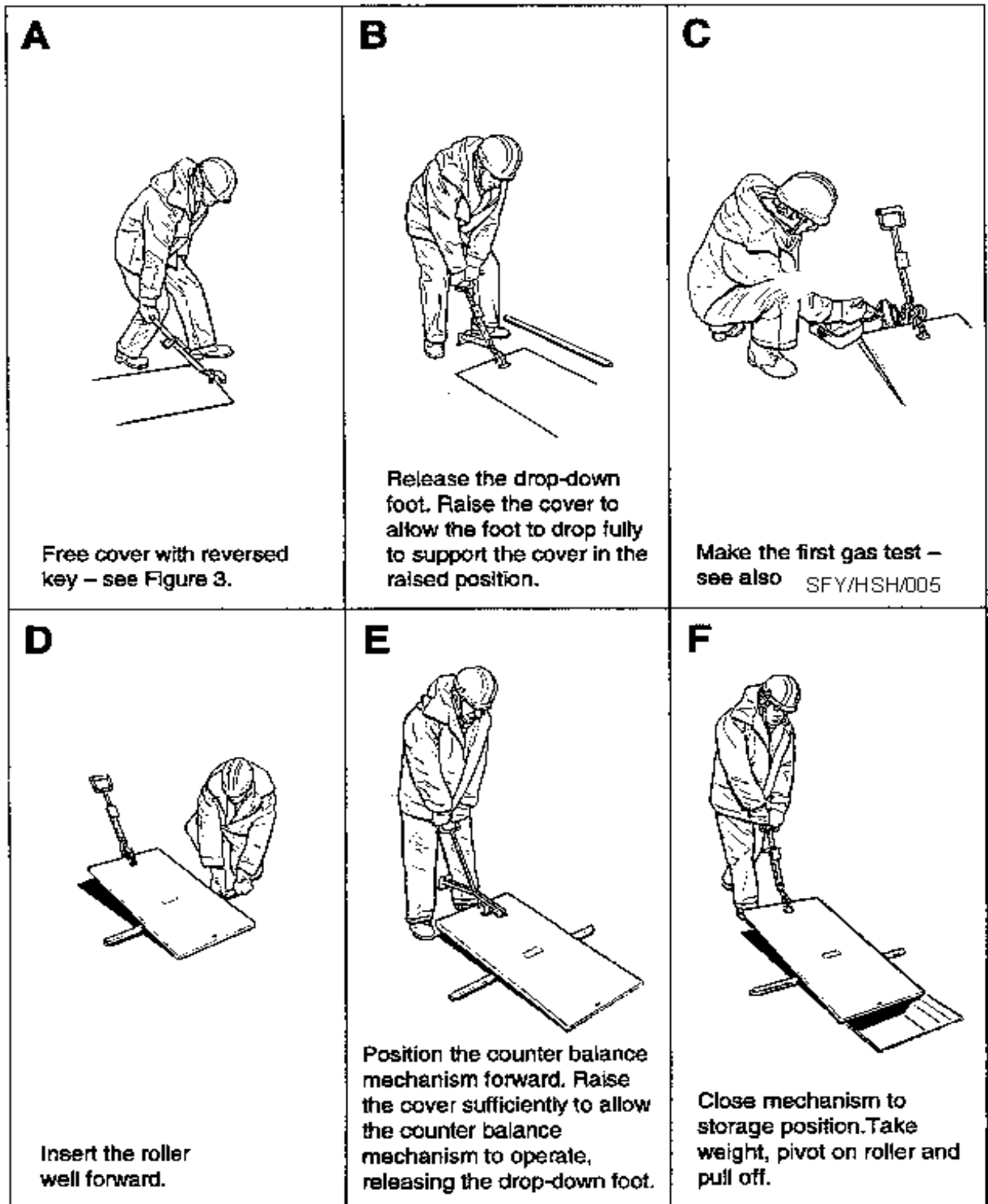
Figure 4 - Key, Joint Box 5

Having made the modification, now use the Key to free the cover as shown in Figure 3.

After breaking the seal restore the lifting tang to the position illustrated in Figure 4.

The basic step by step procedure using the key, cover roller technique, applies to all footway type covers. This is set out in Figure 5.

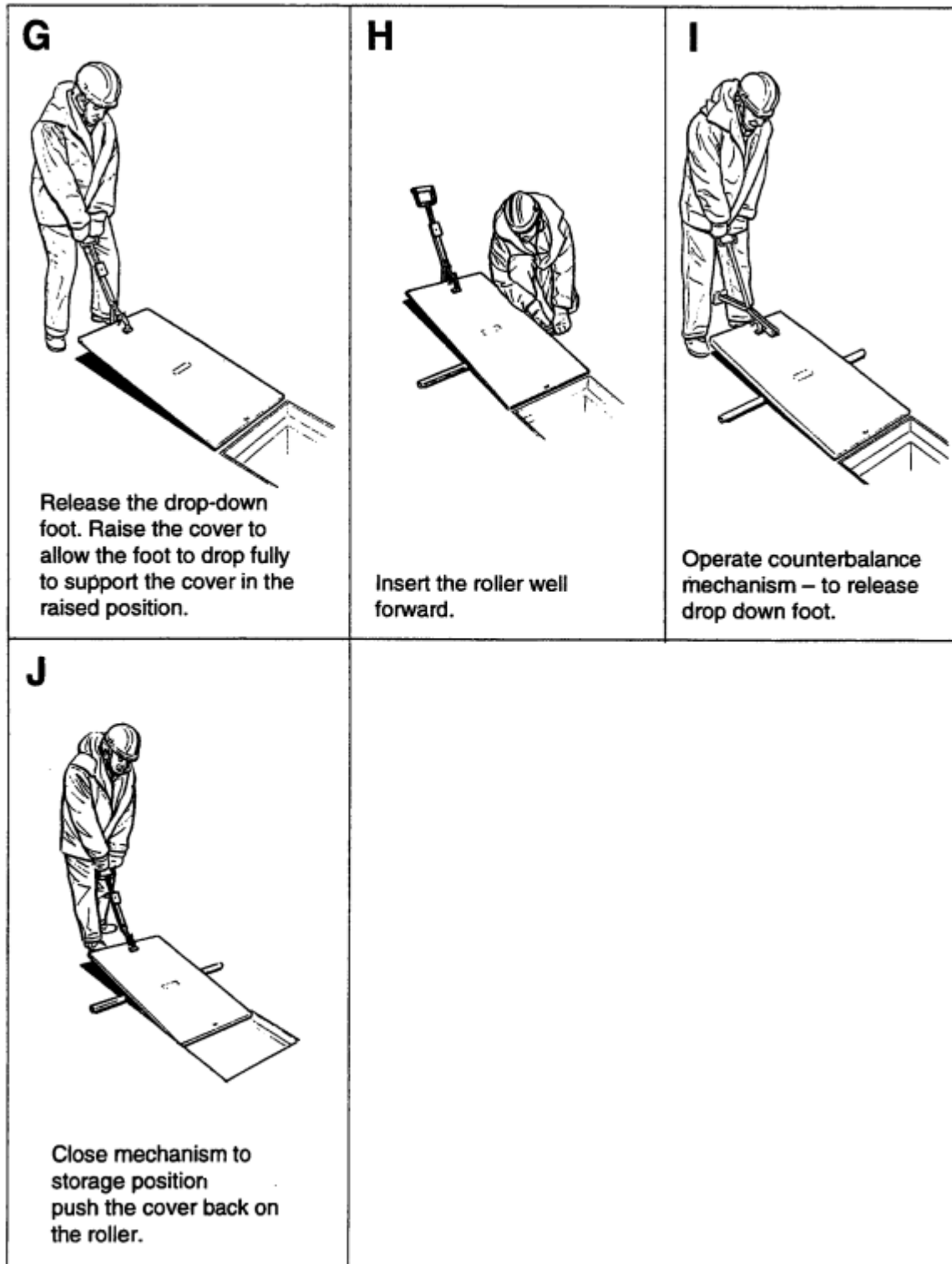
Figure 5 - The Basic Cover Removal Procedure



Before replacing a cover make sure that you clean out the frame seatings.

Figure 6 shows the sequence of operations to replace a cover.

Figure 6 - The Basic Cover Replacement Procedure



8.1 Removing and Replacing 'A' Type Covers

These covers are easily recognised because they consist of a cast iron shell with a concrete infill. To remove a cover follow the basic procedure detailed in Figure 5 up to and including stage E, then close the mechanism to its storage position. Now transfer the Key, Joint Box 5 to the keyhole at the other end of the cover and roll the cover off. Cover replacement is as shown in Figure 6.

8.2 Removing Double Covers (see Figure 7)

To remove the two covers from a Frame and Cover 6 each cover is removed in turn using the basic cover removal procedure. **Ensure crosspiece is present before removing covers.**

The joint box opening will prevent use of a pulling action when replacing the first cover. Push it back using roller and key, taking care that the leading edge of the cover does not jam in the frame - this is achieved by keeping the roller well forward and the leading edge of the cover up until the final position is reached.

Note: **Always ensure crosspiece is replaced.**

Figure 7 - JF6 Cover Removal

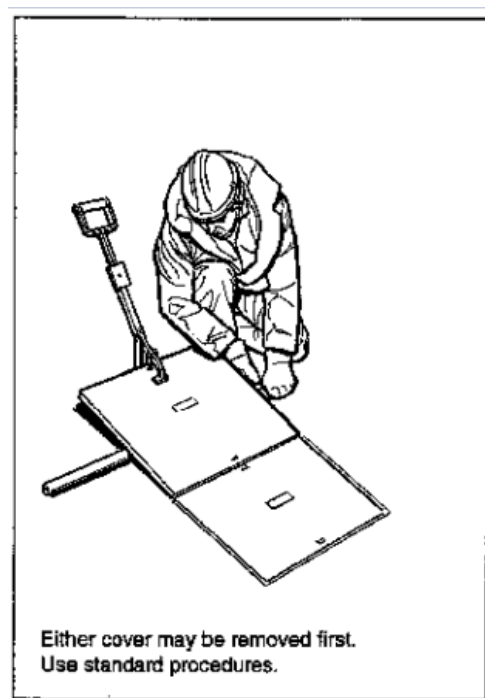


Figure 8 - JF 10 & 11 Cover Removal

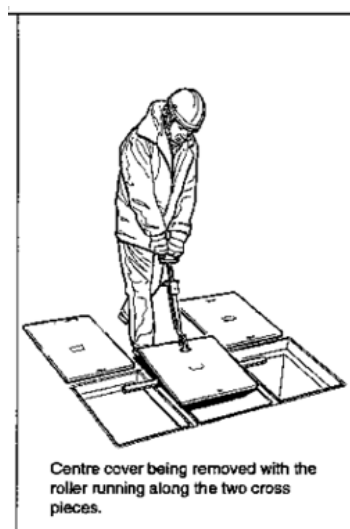


8.3 Removing Triple Covers (see Figure 8)

Where covers are removed from Frames and Covers 10 or 11 the preferred procedure is to follow the direction of the track, remove the centre cover first, by both breaking the seal and pulling it in the direction of one of the other covers, then remove the end covers.

Where it is not possible to use the procedure above and covers have to be removed at right angles to the track, **you must ensure crosspieces are present before removing covers**. Once confirmed, remove the end covers first, and the centre cover is then removed with the roller supported on the two cross pieces. (Figure 8A)

(Figure 8A)



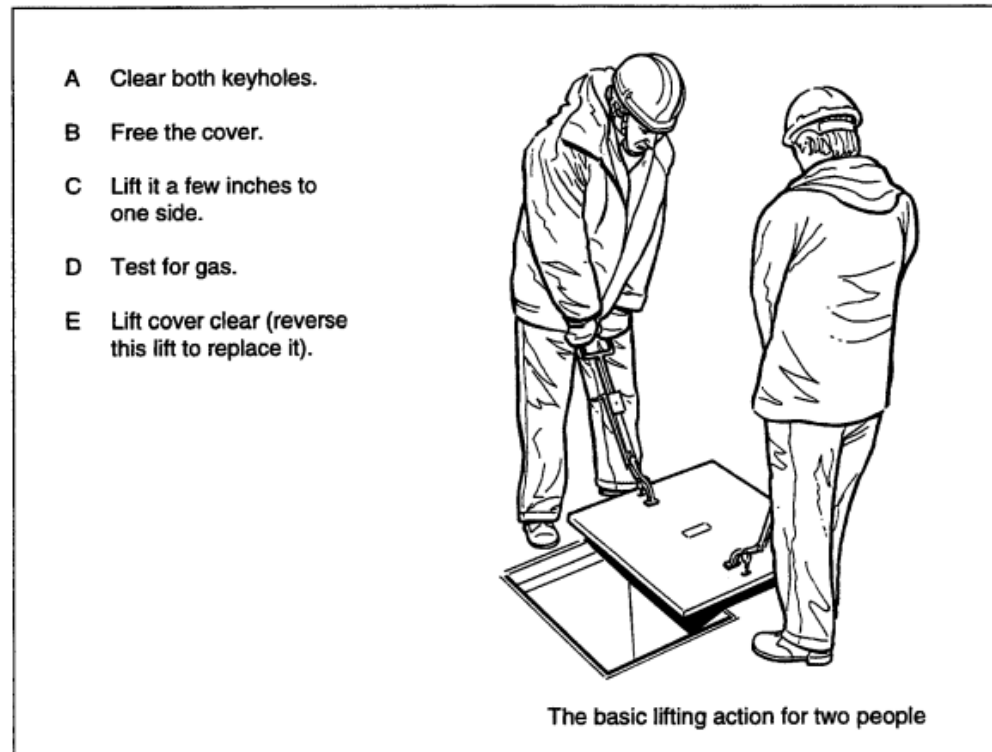
Replace covers in reverse order using basic cover replacement procedure.

Note: Always ensure crosspieces are replaced.

8.4 Non Standard Situations - Two Person Lift

Situations can arise, for example, if a frame and cover projects several inches above a footway under construction, where recourse to a two person lift is necessary. Figure 9 shows the procedure which should be followed.

Figure 9 - Two Person Lift



8.5 Key Insertion Safety Shim (KISS) Tool

To help operational people access our network in a safe and cost effective way, the [Keyhole Insertion Safety Shim \(or KISS tool\)](#) - item code 056488 - has been developed and introduced, to assist access of jointing chambers where worn keyholes exist. The KISS tool must be used in conjunction with the Key Joint Box No. 5 for removing and replacing footway joint box covers where the existing keyhole is worn. It should also eradicate the need to replace affected covers in most circumstances.

The low cost portable KISS tool temporarily restores the integrity of a worn keyhole to allow the cover to be lifted safely. The double ended KISS tool is made from formed metal and has a 20mm end and a 17mm end.

If the KISS tool is successful in assisting the lift of a cover with worn keyholes, do not submit an A1024 for cover replacement. Figure 10, below, shows the new KISS tool:

Figure 10: Above: The Keyhole Insertion Safety Shim (KISS tool), Item Code 056488



Figure 11: Above: A typical worn chamber cover keyhole



8.5.1 Operation – How to use the KISS tool:**8.5.1.1 On site Risk Assessment**

An 'On Site' Risk Assessment must be conducted prior to using the KISS tool because it is not suitable for all worn keyholes. It should not be used when the metal work of the keyhole is highly corroded and or the wear is so severe as to prevent the KISS tool from engaging effectively. In such cases, do not attempt to apply the KISS tool and follow the A1024 process to report the faulty cover. **Figure 12**, shows an example of a corroded keyhole / cover.

Figure 12: A corroded keyhole



Caution: The tool is not suitable for use with certain types of covers. Refer to the table below.

Type of Cover:	Can the KISS tool be used?
Steel Type Footway Cover (See Figure 12)	YES
Castellated Cast Iron Cover (See Figure 13)	NO
Precinct Covers (e.g. containing brick paving)	NO Note: Precinct frame and covers (containing brick paving) are recommended to be lifted using the Lifter Manhole No. 4 as detailed in ISIS EPT/UGP/B019 .

Note: The KISS tool is not suitable for use on older cast iron castellated covers. For identification purposes, an example is pictured below in **Figure 13**.

Figure 13: Castellated cast iron cover



8.5.1.2 Inserting the KISS tool

The KISS tool has two different sized ends, a 20mm end and a tapered 17 mm element to cope with different degrees of key hole wear. Always try to insert the 20mm end first – if it is too big, move on to try the 17mm end.

Figure 14, shows the KISS tool inserted into a keyhole.

Figure 14: Inserting the KISS tool into a Worn Keyhole.



8.5.1.3 Breaking the seal

Once the KISS tool is in place, insert the Key Joint Box (KJB) No. 5 and break the seal in accordance with usual instructions contained in this ISIS.

Figure 15 shows the KJB No. 5 in conjunction with the KISS tool.

Figure 15: Key Joint Box No.5 and KISS tool.



8.5.1.4 Removing the chamber cover

After breaking the seal, reverse the Key Joint Box No.5 and lift and remove the lid using standard practices as detailed in this ISIS.

Figure 16 shows the KJB No.5 in position.

Figure 16: KJC No.5 and KISS tool prior to removal of chamber cover.



8.5.1.5 Replacing the jointing chamber cover:

When replacing the cover, ensure that the KISS tool is in place and follow standard practices outlined in this document.

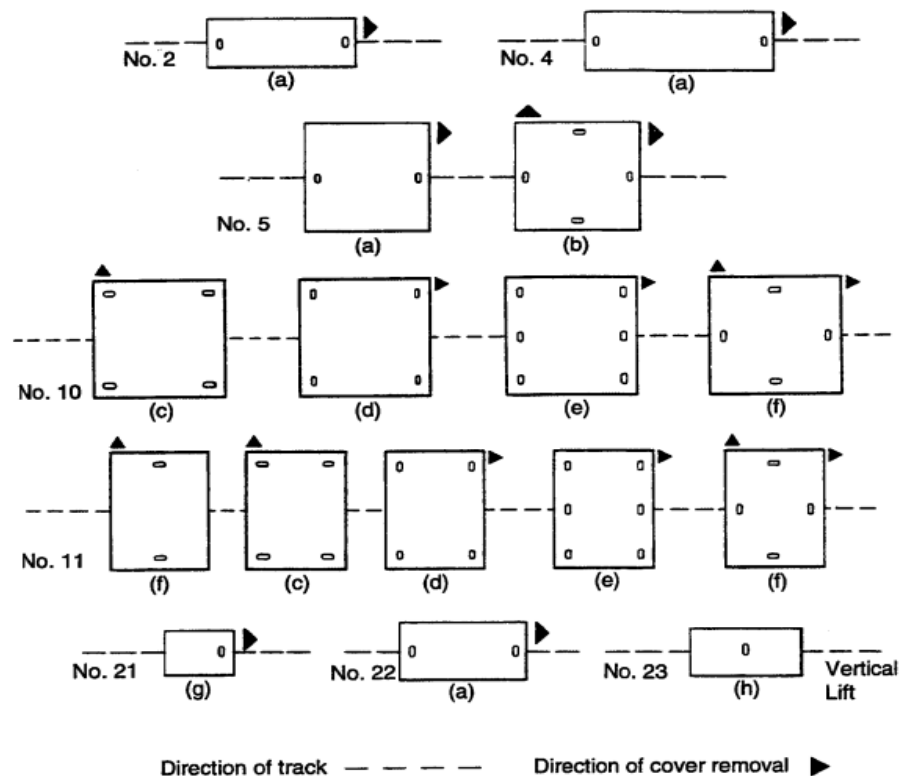
9 ***Covers, Footway and Driveway***

These covers are fully described in EPT/UGP/B014.

Removal and replacement of these covers may be carried out using the following methods:

- Lifter, Manhole Cover 4 (see Paragraph 7)
- Key, Joint Box 5, by one or two people (see Paragraph 8)
- Keyhole Positions. Because of different sources of manufacture and design changes, the keyhole positions vary in some types of footway cover. Figure 20 shows various cover types together with the keyhole positions that will be met. As the direction of removal is dependent on keyhole position, arrow heads have been inserted to indicate the direction of removal of particular covers.

Figure 20 - Footway/Driveway Cover Keyhole Arrangements



10 ***Cover, Carriageway 4***

These covers are of steel and concrete construction and are identified by the legend 'CW' on the cover plaque. These covers are approximately 75 mm thick and are heavier than either the Covers, Footway 4 or Covers, Driveway 4.

Removal and replacement of this type of cover **must** be carried out using the Lifter, Manhole Cover 4 together with a Lifter, Manhole Cover Part 5 as described in Paragraph 7.

11 ***Cover, Manhole 6A***

This cover is constructed of cast iron with a concrete infill and is recognisable because the concrete infill is divided into four.

Removal and replacement of this cover **must** be carried out using the Lifter, Manhole Cover 4 together with two Parts 5 as described in Paragraph 7.

12 ***Cover, Unit Type Light***

These covers are constructed either of cast iron with an asphalt infill or of solid cast iron.

Removal and replacement of this cover **must** be carried out using the Lifter, Manhole Cover 4 together with two Parts 5 as described in Paragraph 7 of this Practice.

13 ***Cover, Temporary Reinforced Concrete***

These covers are in the form of reinforced concrete slabs of various sizes. They were provided in small numbers in lieu of standard covers during periods of steel shortage.

Removal and replacement of this cover **must** be carried out using the Lifter, Manhole Cover 4 together with Parts 5 as described in Paragraph 7 of this Practice.

14 **Covers 21, 22 and 23**

These are small covers fitted to pre-fabricated joint boxes and are handled in the following manner:

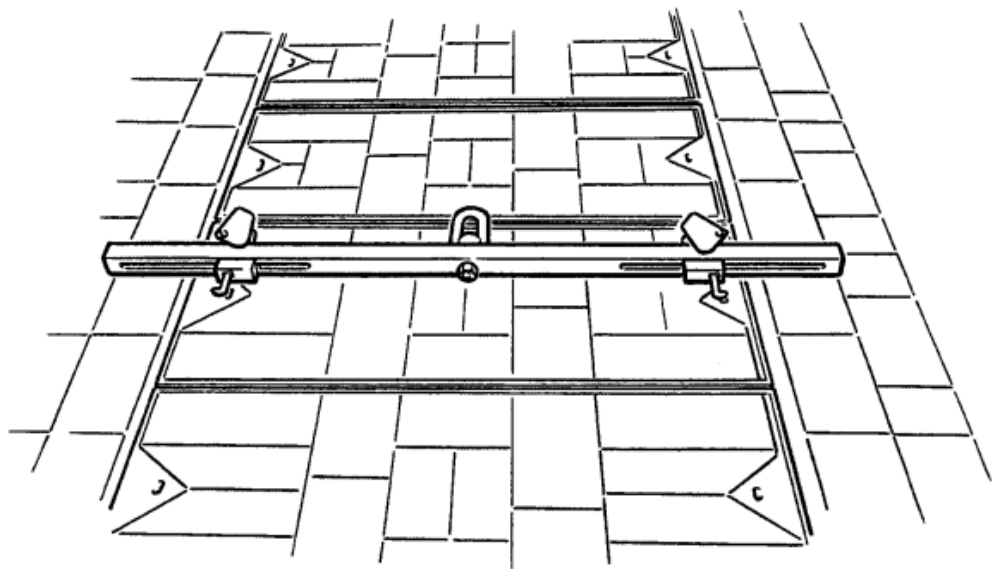
1. Covers 21 and 22 - Insert a Key, Joint Box 3 (see Paragraph 5), raise and slide back the cover.
2. Cover 23 - Insert a Key, Joint Box 5 and remove the cover by lifting it vertically out of the box.

15 **Covers, Precinct**

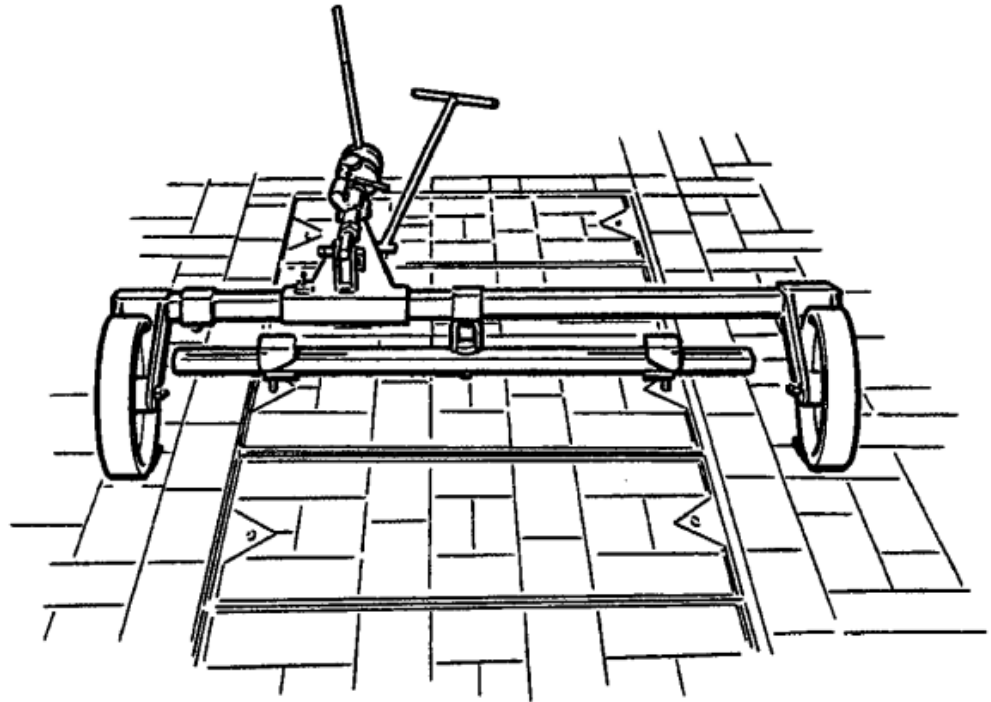
Frames and Covers Precinct are fully described in [EPT/UGP/B019](#). Precinct covers are easily recognised because they are usually filled with block paving or some other decorative infill to match the surrounding surface.

Removal and replacement of these covers is achieved using a Lifter, Manhole Cover 4 together with Lifter, Manhole Cover Part 5. In order to remove a cover, first position the Part 5 as shown in Figure 21 and secure in place as described in paragraph 7.

Figure 21 - Lifter, Manhole Cover Part 5C



Straddle the cover to be lifted with the LMC4 and engage the hook on the lifter with the loop on part 5 (see Figure 22). Operate the lifter as described in Paragraph 7.

Figure 22 - Cover Removal

Carry out gas test.

Remove the cover to a safe place within the work area (see Paragraph 6).

Note: On large multiple cover units remove the centre cover(s) first and work outwards towards the end covers

Once two covers have been removed the cross-beam can be withdrawn using the LMC4 together with two Lifter, Manhole Cover Parts 4A (see Figure 23). Insert the tangs of Parts 4A into the keyholes in the cross-beam and turn each key through 90 degrees. Engage the hooks on the LMC4 with the loops of the keys as shown in Figure 24. Operate the LMC4 as described in Paragraph 7 to raise the beam clear of the frame and remove to a safe place within the working area (see Paragraph 6).

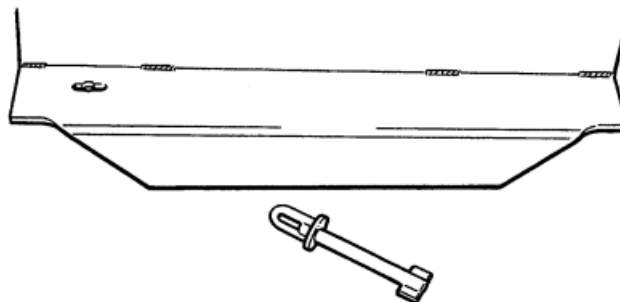
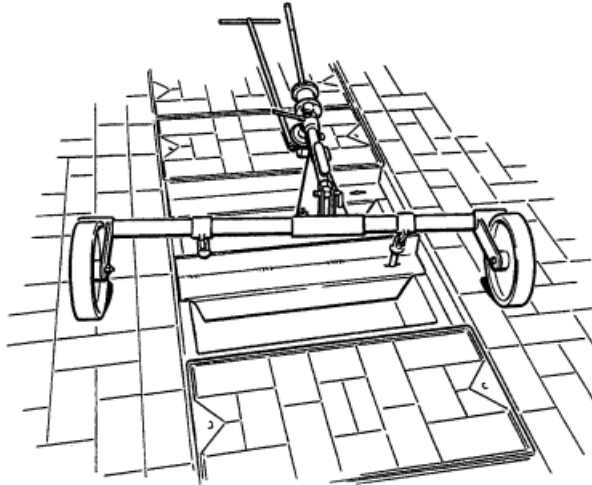
Figure 23 - Lifter, Manhole Cover Part 4A (Item Code 126652)

Figure 24 - Removal of Cross-beam



Repeat the above procedure until all the covers and cross-beams have been removed.

Replacement of the covers and cross-beams is the reverse of the procedure described above.

16 **References**

Health and Safety Executive Guidance Document L23 - Manual Handling Operations Regulations 1992.

ISIS Documents

- EPT/UGP/B014 - Frames and Covers, Footway
- [EPT/UGP/B019](#) - Frames and Covers, for Precincts
- SFY/HSB/D050 - Health & Safety Handbook - Gas Precautions
- SFY/HSB/C006 - Health & Safety Handbook - Manual Handling
- Safety at Streetworks and Roadworks

END OF DOCUMENT
