

MHCA - Worked Examples

Introduction

In accordance with the FReM (2.1.5) financial statements should be prepared under the historical cost convention, modified by the revaluation of fixed assets, current asset investments and stocks.

Modified Historic Cost Accounting (MHCA) is an accounting convention whereby certain assets are reflected at current values.

Establishing the current value for fixed assets is normally achieved through a mixture of professional valuation and by using appropriate price indices.

The worked examples are designed to provide guidance on how entities apply price indices to revalue assets at a current value and the resulting accounting entries. The examples cover upwards revaluations, downwards revaluations and a scenario whereby an asset first increases and then decreases in value.

A further example has been included to demonstrate how entities should account for a change in the useful economic life (UEL) of an asset part way through its life.

The guidance starts with a brief description of the key concepts, which you should be aware of.

Key Concepts

1. Price Indices

The value at which assets are included in the balance sheet should be reviewed annually and where an asset's value has changed materially the valuation should be adjusted accordingly.

The most common method of revaluing fixed assets in the intervening years, between professional valuations, is to apply price indices to calculate the current value of a fixed asset.

Entities should use the indices they consider most appropriate given their own individual circumstances. Having identified appropriate indices, these should be applied consistently from one period to another. Entities should include in their accounting policies note, a brief description of the indices they have used.

2. Net versus Gross method of calculating depreciation arising from MHCA

The gross and the net methods relate to how revaluations are presented for tangible fixed assets carried at a current value. The gross method separately revalues the gross value and the accumulated depreciation (through backlog depreciation). The net method provides one figure for the gross value and the net book value, as accumulated depreciation is eliminated.

Depreciation charges and net book values are the same for both methods.

Assets valued on a market-based valuation can normally only apply the net basis as the valuation provides a snapshot view of the current value of the asset in its existing condition e.g. an office building. Under FRS15 assets valued on a DRC basis can apply either the net or the gross method although the gross method more closely reflects the realities of the DRC approach.

The gross method is considered the most appropriate method for government as it provides the information necessary for Whole of Government Accounts (WGA) which adopts the gross presentation. The expectation is that bodies will be able to provide the data required for WGA.

The first worked example is calculated under both methods to illustrate that both methods give rise to the same overall results but also to show the additional information which the gross method provides and which is required for WGA. Otherwise, the worked examples have been prepared using the gross method.

3. Depreciation

In accordance with FRS 15, depreciation should be provided for all fixed assets with a finite useful life. Fixed assets are depreciated by allocating the cost (or revalued amount), less estimated residual value of the assets as fairly as possible to the periods expected to benefit from their use.

The depreciation methods used should be the ones which are most appropriate given the nature of the assets and their use by the entity. Where a decision is taken to dispose of an asset prior to the end of its estimated useful life and all other factors remain unchanged, the useful economic life (UEL) should be revised to reflect the remaining period of service and the residual value, adjusted for the expected sale proceeds, less costs.

In accordance with FRS 15 entities may select whether depreciation is based on opening, closing or average balance sheet values.

4. Asset Useful economic Lives (UEL)

The UEL of assets and their residual values should be estimated on a realistic basis. Where material, the UEL and the residual values should be reviewed at the end of each reporting period, and revised where necessary. A change in either UEL or residual value should be accounted for prospectively over the asset's remaining UEL.

5. Transferring the realised element of depreciation

In accordance with the FReM (7.4.55), the revaluation reserve should reflect the unrealised element of the cumulative balance of indexation and revaluation adjustments to assets other than donated assets. Each year, the realised element of the reserve (i.e. an amount equal to the excess of actual depreciation over depreciation based on historical cost) should be transferred from the reserve to the general fund. The worked examples include this transfer but entities should decide whether to do so on the grounds of materiality.

Example 1 – Upwards Revaluation of an asset

Scenario:

An asset is acquired in year 1 for £90,000. It has a useful economic life (UEL) of 3 years with no residual value at the end of the UEL.

The indices are as follows:

Index at purchase	100
Index at the end of year 1	106
Index at the end of year 2	114
Index at the end of year 3	124

Depreciation is provided on a straight-line basis

For this exercise you need to calculate:

- the revaluation,
- the depreciation charge to the OCS, and
- the realised element of depreciation.

This is achieved by calculating:

$$\text{OGCRC} \times \frac{\text{index at end of year}}{\text{Index at start of year}} = \text{CGCRC} - \text{OGCRC} = \text{revaluation of GCRC}$$

$$\text{OAD} \times \frac{\text{index at end of year}}{\text{Index at start of year}} - \text{OAD} = \text{revaluation of accumulated depreciation}$$

$$\frac{\text{CGCRC}}{\text{Total UEL}} = \text{depreciation charge to the OCS}$$

Depreciation charge to the OCS – historic cost based depreciation = realised element of depreciation

Note:

OGCRC - in year 1 the opening gross current replacement cost (OGCRC) is the opening value of the asset as it is brought on to the balance sheet. In subsequent years it is the previous year's closing gross current replacement cost.

CGCRC - the closing gross current replacement cost (CGCRC) is the gross current replacement cost of the asset after it has been revalued.

OAD – the opening accumulated depreciation

UEL - the useful economic life of the asset

Historic cost depreciation - this is the original value of the asset as it is brought on to the balance sheet, less subsequent impairment, divided by the total UEL

Year 1

Revaluation – OGCRC	$90,000 \times \frac{106}{100} = 95,400 - 90,000 = \text{£}5,400$
Depreciation charge to the OCS	$\frac{95,400}{3} = \text{£}31,800$
Realised element	$31,800 - 30,000 = \text{£}1,800$

The gross asset value has increased by £5,400. The accounting entries are:

DR	FA	£5,400
CR	revaluation reserve	£5,400

Accumulated depreciation is the same as the depreciation charge for the year in year 1 (this is always the case.)

The depreciation charge to the OCS is £31,800. The accounting entries are:

DR	OCS	£31,800
CR	accumulated depreciation	£31,800

The realised element of depreciation is £1,800. The accounting entries are:

DR	revaluation reserve	£1,800
CR	general fund	£1,800

Year 2

Revaluation – OGCRC	$95,400 \times \frac{114}{106} = 102,600 - 95,400 = \text{£}7,200$
– depreciation	$31,800 \times \frac{114}{106} - 31,800 = \text{£}2,400$
Depreciation charge to the OCS	$\frac{102,600}{3} = \text{£}34,200$
Realised element	$34,200 - 30,000 = \text{£}4,200$

The gross asset value has increased by £7,200 and the accumulated depreciation by £2,400 resulting in a net credit to the revaluation reserve of £4,800. The accounting entries are:

DR	FA	£7,200
CR	accumulated depreciation	£2,400
CR	revaluation reserve	£4,800

The depreciation charge for the year is £34,200. The accounting entries are:

DR	OCS	£34,200
CR	accumulated depreciation	£34,200

The realised element of depreciation is £4,200. The accounting entries are:

DR	revaluation reserve	£4,200
CR	general fund	£4,200

Year 3

Revaluation – OGCR	$102,600 \times \frac{124}{114} = 111,600 - 102,600 = \text{£}9,000$
– depreciation	$68,400 \times \frac{124}{114} - 68,400 = \text{£}6,000$
Depreciation charge to the OCS	$\frac{111,600}{3} = \text{£}37,200$
Realised element	$37,200 - 30,000 = \text{£}7,200$

The gross asset value has increased by 9,000 and the accumulated depreciation by £6,000, resulting in a net credit to the revaluation reserve of £3,000. The accounting entries are:

DR	FA	£9,000
CR	accumulated depreciation	£6,000
CR	revaluation reserve	£3,000

The depreciation charge for the year is £37,200. The accounting entries are:

DR	OCS	£37,200
CR	accumulated depreciation	£37,200

The realised element of depreciation is £7,200. The accounting entries are:

DR	revaluation reserve	£7,200
CR	general fund	£7,200

Summary

Over the UEL of the asset the following transactions were calculated and posted:

- At the end of its UEL the asset was revalued to a gross value of £111,600
- Accumulated depreciation of £111,600 writes out the value of the asset at the end of its UEL
- The revaluation reserve nets to nil at the end of the 3 years
- Depreciation charged to the OCS is £103,200. The gross value at the end of an asset's life is not charged in full to the OCS as the asset did not have that gross value throughout its life.

Fixed Asset Note

	Year 1	Year 2	Year 3
Cost / valuation			
Opening cost / value	90,000	95,400	102,600
Additions			
Disposals			
Revaluation	5,400	7,200	9,000
Closing cost / value	95,400	102,600	111,600
Depreciation			
Opening		31,800	68,400
Charge for the year	31,800	34,200	37,200
Disposals			
Revaluations		2,400	6,000
Closing	31,800	68,400	111,600
Net Book Value	63,600	34,200	0

Example 1b – Upwards Revaluation of an asset Using the Net Method

This example follows exactly the same scenario as in the first worked example but presents the revaluation on a net basis.

Scenario:

An asset is acquired in year 1 for £90,000. It has a useful economic life (UEL) of 3 years with no residual value at the end of the UEL.

The indices are as follows:

Index at purchase	100
Index at the end of year 1	106
Index at the end of year 2	114
Index at the end of year 3	124

Depreciation is provided on a straight-line basis

For this exercise you need to calculate:

- the revaluation,
- the depreciation charge to the OCS, and
- the realised element of depreciation.

This is achieved by calculating:

$$\text{ONBV} \times \frac{\text{index at end of year}}{\text{Index at start of year}} = \text{NBV after revaluation} - \text{ONBV} = \text{revaluation of NBV}$$

$$\frac{\text{NBV after revaluation}}{\text{Remaining UEL at start of year}} = \text{depreciation charge to the OCS}$$

Depreciation charge to the OCS – historic cost based depreciation = realised element of depreciation

Note:

ONBV - in year 1 the opening net book value (ONBV) is the opening value of the asset as it is brought on to the balance sheet. In subsequent years it is the previous year's closing net book value (CNBV).

UEL - the useful economic life of the asset

Historic cost depreciation - this is the original value of the asset as it is brought on to the balance sheet, less subsequent impairment, divided by the total UEL

Year 1

Revaluation	$90,000 \times \frac{106}{100} = 95,400 - 90,000 = \text{£}5,400$
Depreciation charge to the OCS	$\frac{95,400}{3} = \text{£}31,800$
Realised element	$31,800 - 30,000 = \text{£}1,800$

The net asset value has increased by £5,400. The accounting entries are:

DR	FA	£5,400
CR	revaluation reserve	£5,400

The depreciation charge for the year is £31,800. The accounting entries are:

DR	OCS	£31,800
CR	accumulated depreciation	£31,800

The CNBV is £63,600 (95,400 – 31,800). This is the ONBV for year 2.

The realised element of depreciation is £1,800. The accounting entries are:

DR	revaluation reserve	£1,800
CR	general fund	£1,800

Year 2

Revaluation	$63,600 \times \frac{114}{106} = 68,400 - 63,600 = \text{£}4,800$
Depreciation charge to the OCS	$\frac{68,400}{2} = \text{£}34,200$
Realised element	$34,200 - 30,000 = \text{£}4,200$

The net asset value has increased by £4,800. The accounting entries are:

DR	FA	£4,800
CR	revaluation reserve	£4,800

The depreciation charge for the year is £34,200. The accounting entries are:

DR	OCS	£34,200
CR	accumulated depreciation	£34,200

The CNBV is £34,200 ($63,600 - 34,200$). This is the ONBV for year 3.

The realised element of depreciation is £4,200. The accounting entries are:

DR	revaluation reserve	£4,200
CR	general fund	£4,200

Year 3

Revaluation	$34,200 \times \frac{124}{114} = 37,200 - 34,200 = \text{£}3,000$
Depreciation charge to the OCS	$\frac{37,200}{1} = \text{£}37,200$
Realised element	$37,200 - 30,000 = \text{£}7,200$

The net asset value has increased by 3,000. The accounting entries are:

DR	FA	£3,000
CR	revaluation reserve	£3,000

The depreciation is £37,200. The accounting entries are:

DR	OCS	£37,200
CR	accumulated depreciation	£37,200

The CNBV is zero ($37,200 - 37,200$) as it is the end of the asset's UEL.

The realised element of depreciation is £7,200. The accounting entries are:

DR	revaluation reserve	£7,200
CR	general fund	£7,200

Summary

Over the UEL of the asset the following transactions were calculated and posted:

- Depreciation charges of £103,200 write out the net book value of asset at the end of its UEL
- The revaluation reserve nets nil at the end of the 3 years
- Depreciation charged to the OCS is £103,200.

Fixed Asset Note

	Year 1	Year 2	Year 3
Cost / valuation			
Opening cost / value	90,000	63,600	34,200
Additions			
Disposals			
Revaluation	5,400	4,800	3,000
Closing cost / value	95,400	68,400	37,200
Depreciation			
Charge for the year	31,800	34,200	37,200
Disposals			
Net Book Value	63,600	34,200	0

As you can see both methods achieve the same overall results and the same total depreciation charge to the OCS, but the gross method identifies the gross asset value and accumulated depreciation.

Example 2 – Downwards Revaluation of an asset

Scenario:

An asset is acquired in year 1 for £90,000. It has a useful economic life (UEL) of 3 years with no residual value at the end of the UEL.

The indices are as follows:

Index at purchase	100
Index at the end of year 1	98
Index at the end of year 2	93
Index at the end of year 3	85

Depreciation is provided on a straight-line basis.

The decline in value is thought to be permanent rather than a temporary reduction that could reverse in later years.

The calculations required are the same as in the first example i.e. reductions in the value of an asset are calculated and reported in the same way as are increases in the value of an asset. However, as the asset reduces rather than increases in value there isn't a realised element within the revaluation reserve that requires transferring to the general fund i.e. there is no credit balance within the revaluation reserve in respect of this asset.

For this exercise you need to calculate:

- the revaluation, and
- the depreciation charge to the OCS.

This is achieved by calculating:

$$\text{OGCRC} \times \frac{\text{index at end of year}}{\text{Index at start of year}} = \text{CGCRC} - \text{OGCRC} = \text{revaluation of GCRC}$$

$$\text{OAD} \times \frac{\text{index at end of year}}{\text{Index at start of year}} - \text{OAD} = \text{revaluation of accumulated depreciation}$$

$$\frac{\text{CGCRC}}{\text{Total UEL}} = \text{depreciation charge to the OCS}$$

Refer to example 1 for definitions of OGCR, CGCR, UEL and OAD

Year 1

Revaluation	$90,000 \times \frac{98}{100} = 88,200 - 90,000 = -£1,800$
Depreciation charge to the OCS	$\frac{88,200}{3} = £29,400$

The gross asset value has reduced in value by £1,800. The accounting entries are:

DR	OCS	£1,800
CR	FA	£1,800

Accumulated depreciation is the same as the depreciation charge for the year in year 1 (this is always the case.)

The depreciation charge for the year is £29,400. The accounting entries are:

DR	OCS	£29,400
CR	accumulated depreciation	£29,400

Year 2

Revaluation – OGCR	$88,200 \times \frac{93}{98} = 83,700 - 88,200 = -£4,500$
– depreciation	$29,400 \times \frac{93}{98} - 29,400 = -£1,500$
Depreciation charge to the OCS	$\frac{83,700}{3} = £27,900$

The gross asset value has reduced in value by £4,500 and accumulated depreciation has reduced by £1,500. As there is no credit balance in the revaluation reserve in respect of this asset the movement in accumulated depreciation is credited to the OCS. This results in a net debit to the OCS of £3,000. The accounting entries are:

DR	OCS	£3,000
DR	accumulated depreciation	£1,500
CR	FA	£4,500

The depreciation charge for the year is £27,900. The accounting entries are:

DR	OCS	£27,900
CR	accumulated depreciation	£27,900

Year 3

Revaluation – OGCR	$83,700 \times \frac{85}{93} = 76,500 - 83,700 = -£7,200$
– depreciation	$55,800 \times \frac{85}{93} - 55,800 = -£4,800$
Depreciation charge to the OCS	$\frac{76,500}{3} = £25,500$

The gross asset value has reduced in value by £7,200 and accumulated depreciation has reduced by £4,800. As there is no credit balance in the revaluation reserve in respect of this asset the movement in accumulated depreciation is credited to the OCS. This results in a net debit of £2,400 to the OCS. The accounting entries are:

DR	OCS	£2,400
DR	accumulated depreciation	£4,800
CR	FA	£7,200

The depreciation charge for the year is £25,500. The accounting entries are:

DR	OCS	£25,500
CR	accumulated depreciation	£25,500

Summary

Over the UEL of the asset the following transactions were calculated and posted:

- At the end of the UEL the asset was revalued to a gross value of £76,500
- Accumulated depreciation of £76,500 writes out the value of the asset at the end of its UEL
- The OCS is charged with depreciation of £82,800, and impairment charges of £7,200, being the full gross cost of the asset.

Fixed Asset Note

	Year 1	Year 2	Year 3
Cost / valuation			
Opening cost / value	90,000	88,200	83,700
Additions			
Disposals			
Revaluation	-1,800	-4,500	-7,200
Closing cost / value	88,200	83,700	76,500
Depreciation			
Opening		29,400	55,800
Charge for the year	29,400	27,900	25,500
Disposals			
Revaluations		-1,500	-4,800
Closing	29,400	55,800	76,500
Net Book Value	58,800	27,900	0

Example 3 – Upward Revaluation followed by a Downward Revaluation of an Asset

Scenario:

An asset is acquired in year 1 for £90,000. It has a useful economic life (UEL) of 3 years with no residual value at the end of the UEL.

The indices are as follows:

Index at purchase	100
Index at the end of year 1	106
Index at the end of year 2	104
Index at the end of year 3	98

Depreciation is provided on a straight-line basis

The reduction in value of the asset in years 2 and 3 are considered to be due to fluctuations in the market value and therefore can be charged to the revaluation reserve.

For this exercise you need to calculate:

- the revaluation,
- the depreciation charge to the OCS, and
- the realised element of depreciation.

This is achieved by calculating:

$$\text{OGCRC} \times \frac{\text{index at end of year}}{\text{Index at start of year}} = \text{CGCRC} - \text{OGCRC} = \text{revaluation of GCRC}$$

$$\text{OAD} \times \frac{\text{index at end of year}}{\text{Index at start of year}} - \text{OAD} = \text{revaluation of accumulated depreciation}$$

$$\frac{\text{CGCRC}}{\text{Total UEL}} = \text{depreciation charge to the OCS}$$

Depreciation charge to the OCS – historic cost based depreciation = realised element of depreciation

Refer to example 1 for definitions of OGCR, CGCR, UEL and OAD.

Year 1

Revaluation	$90,000 \times \frac{106}{100} = 95,400 - 90,000 = \text{£}5,400$
Depreciation charge to the OCS	$\frac{95,400}{3} = \text{£}31,800$
Realised element	$31,800 - 30,000 = \text{£}1,800$

The gross asset value has increased by £5,400. The accounting entries are:

DR	FA	£5,400
CR	revaluation reserve	£5,400

Accumulated depreciation is the same as the depreciation charge for the year in year 1 (this is always the case.)

The depreciation for the year is £31,800. The accounting entries are:

DR	OCS	£31,800
CR	accumulated depreciation	£31,800

The realised element is £1,800. The accounting entries are:

DR	revaluation reserve	£1,800
CR	general fund	£1,800

Year 2

Revaluation – OGCR	$95,400 \times \frac{104}{106} = 93,600 - 95,400 = -£1,800$
– depreciation	$31,800 \times \frac{104}{106} - 31,800 = -£600$
Depreciation charge to the OCS	$\frac{93,600}{3} = £31,200$
Realised element	$31,200 - 30,000 = £1,200$

The gross asset value has reduced by £1,800 and accumulated depreciation has reduced by £600. This results in a net charge of £1,200. This can be charged in full against the revaluation reserve as there is a credit balance in the revaluation reserve from year 1 which exceeds the net charge. The accounting entries are:

DR	revaluation reserve	£1,200
DR	accumulated depreciation	£600
CR	FA	£1,800

The depreciation charge for the year is £31,200. The accounting entries are:

DR	OCS	£31,200
CR	accumulated depreciation	£31,200

The realised element of depreciation is £1,200. The accounting entries are:

DR	revaluation reserve	£1,200
CR	general fund	£1,200

Year 3

Revaluation – OGCR	$93,600 \times \frac{98}{104} = 88,200 - 93,600 = -£5,400$
– depreciation	$62,400 \times \frac{98}{104} - 62,400 = -£3,600$
Depreciation charge to the OCS	$\frac{88,200}{3} = £29,400$

The gross asset value has reduced in value by £5,400 and accumulated depreciation has reduced by £3,600 resulting in a net charge of £1,800. Only part of the net charge can be charged to the revaluation reserve, up to the value of the credit balance in the revaluation reserve. The credit balance at the start of year 3 is calculated to be £1,200. The remaining £600 is charged to the OCS. The accounting entries are:

DR	revaluation reserve	£1,200
CR	FA	£1,200

And

DR	OCS	£600
DR	accumulated depreciation	£3,600
CR	FA	£4,200

The depreciation charge for the year is £29,400. The accounting entries are:

DR	OCS	£29,400
CR	accumulated depreciation	£29,400

As there is no remaining balance within the revaluation reserve there is no realised element to transfer to the revaluation reserve.

Summary

Over the UEL of the asset the following transactions were calculated and posted:

- The asset was revalued to a total gross cost of £88,200.
- Accumulated depreciation of £88,200 writes out the value of the asset at the end of its UEL.
- The revaluation reserve nets to nil at the end of the 3 years
- Over the life of the asset the OCS is charged with total depreciation of £92,400 and impairment of the asset of £600.

Fixed Asset Note

	Year 1	Year 2	Year 3
Cost / valuation			
Opening cost / value	90,000	95,400	93,600
Additions			
Disposals			
Revaluation	5,400	-1,800	-5,400
Closing cost / value	95,400	93,600	88,200
Depreciation			
Opening		31,800	62,400
Charge for the year	31,800	31,200	29,400
Disposals			
Revaluations		-600	-3,600
Closing	31,800	62,400	88,200
Net Book Value	63,600	31,200	0

Example 4 – Changing the UEL of an Asset

Scenario:

An asset is acquired in year 1 for £90,000. It has a useful economic life (UEL) of 3 years with no residual value at the end of the UEL. At the end of year 2 a review of the UEL indicates that the asset still has 3 years UEL remaining.

Depreciation is provided on a straight-line basis

Price indices do not indicate that there has been a material movement in the value of the asset throughout its life.

Year 1

The depreciation is calculated as:

$$\frac{90,000}{3} = \text{£}30,000$$

The accounting entries are:

DR	OCS	30,000
CR	accumulated depreciation	30,000

The net book value (NBV) of the asset is £60,000 (90,000 – 30,000)

There are no other entries required

Year 2

At the end of year 2 it is agreed that the UEL be extended from 3 years to 5 years.

In accordance with FRS 15 when a UEL is revised, the carrying amount of the fixed asset should be depreciated over the revised UEL. The same principle would apply if the asset had been revalued.

1 Calculate the depreciation

The NBV of the asset at the start of year 2 was £60,000 and this should now be depreciated over the remaining 4 years UEL.

The depreciation is calculated as:

$$\frac{60,000}{4} = \text{£}15,000$$

The accounting entries are:

DR	OCS	15,000
CR	accumulated depreciation	15,000

The NBV at the end of year 2 is £45,000 (60,000 – 15,000)

There are no other entries required

Year 3

1 Calculate the depreciation

The NBV of the asset at the start of year 3 was £45,000 and there were 3 years UEL remaining.

The depreciation is calculated as:

$$\frac{45,000}{3} = \text{£}15,000$$

The accounting entries are:

DR	OCS	15,000
CR	accumulated depreciation	15,000

The NBV at the end of year 3 is £30,000 (45,000 – 15,000)

There are no other entries required

Years 4 and 5

The calculations and accounting entries are the same in years 4 and 5 as for year 3.

A further £15,000 depreciation is charged to the OCS in years 4 and 5. As the asset has no residual value the asset is fully depreciated by the end of year 5.