ASSET VALUATION STRATEGY

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Contents

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Document History

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1. Introduction

This Asset Valuation (AV) strategy sets out to define a process whereby an annual highways infrastructure asset valuation may be undertaken in order to inform the Council's accounts and understand the effects of investments on the state of the asset.

An appreciation of the highways infrastructure asset value can assist in the consideration of investment decisions and delivery challenges, which are mitigated through a consideration of various actions and interventions.

An understanding of the condition and deterioration of the asset and the need for investment may also give rise to positive outcomes which can provide an invaluable tool to support the successful management of the highway infrastructure network.

This document considers why highways infrastructure assets are value assessed, the definitions of the staged components required to make the Asset Valuation (AV) calculation, and it also looks at the process for valuation in support of sustainable investment and priority maintenance needs.

This document serves to provide an overview of the AV calculation process and it should be read in conjunction with industry guidance and AV calculation toolkits provided by "Chartered Institute of Public Finance and Accountancy" (CIPFA) as given through the following document links.

- *https://www.cipfa.org/policy-and-guidance/publications/p/property-asset-valuation-a-handbook-for-property-and-finance-professionals-in-local-authorities-2016-edition-online#:~:text=Authorities%20(2016%20Edition)-,Property%20Asset%20Valuation%3A%20A%20Handbook%20for%20Property%20and%20Finance%20Professionals%20in%20Local%20Authorities%20(2016%20Edition),-Summary*
- *https://www.cipfa.org/-/media/Files/Publications/AC142.pdf*
- *Central Gov't AV Guidance*
- *CIPFA AV Guidance Doc*
- *CIPFA Toolkits*

A fundamental component of long-term planning is to ensure that the asset base is preserved and replenished in a sustainable way without imposing an undue financial burden on future generations. The financial monitoring, review, analysis and reporting of the asset is an integral part of asset management and not just a separate accounting exercise which considers the 'as new' vs 'current' asset valuation states through which investment needs and maintenance priorities may in part be determined.

HM Treasury and CIPFA states:

> *"The preservation of the asset base can be measured and monitored over time using a robust asset valuation procedure that provides a true and fair value of the assets".*

Asset Valuation and Asset Maintenance Management should operate within a robust financial framework that will:

- Emphasise the need to preserve and maintain the asset
- Demonstrate good asset management
- Provide monitoring facility through annual trend analysis
- Provide data for lifecycle planning
- Provide data for budgeting
- Emphasises the need to preserve the asset
- Shows good management/stewardship
- Supports Whole of Government Accounts

Asset management plays a key role in supporting asset maintenance investment decisions and in delivering associated financial benefits, but to understand the 'value for money' savings and service benefits that an asset delivers it requires the need to know their value.

2. What is Asset Valuation and what can it tell you?

Asset Valuation is the calculation of how much assets are worth in terms of current monetary value. AV is essentially a fiscal measure of an assets current value reflective of its condition and life cycle performance, calculated in accountancy terms in support of the Highway Authority's annual 'Whole of Government Accounts' submissions.

Within accounting definitions, the term 'asset depreciation' is used to provide a measure of the cost of the economic benefits embodied in an asset that has been consumed during the accounting period.

Assets often have value because of their build quality, reliability, durability or longevity and cost to maintain. For example, some highway assets are short lived, others long lived and to write off the value of a carriageway which could last for many years in the same way as a short-term asset that requires replacement more frequently is not appropriate.

Undertaking a single asset valuation will simply establish the current value of the asset, however undertaking sequential asset valuations over a period allows the accountant and the engineer to understand the asset performance trends in terms of:

- Deterioration
    - How fast the asset is deteriorating.
    - Consideration of the deterioration of the following:
        - Asset
        - Asset Group
        - Infrastructure Network
- Investment
    - Is the investment having the expected effect?
    - Where is the investment making a good return on the asset performance?
    - Is the level of investment adequate to support future maintenance needs?

3. The Asset Valuation Model

The asset valuation/depreciation process may be represented in terms of a simple model as shown in Figure 3.1.

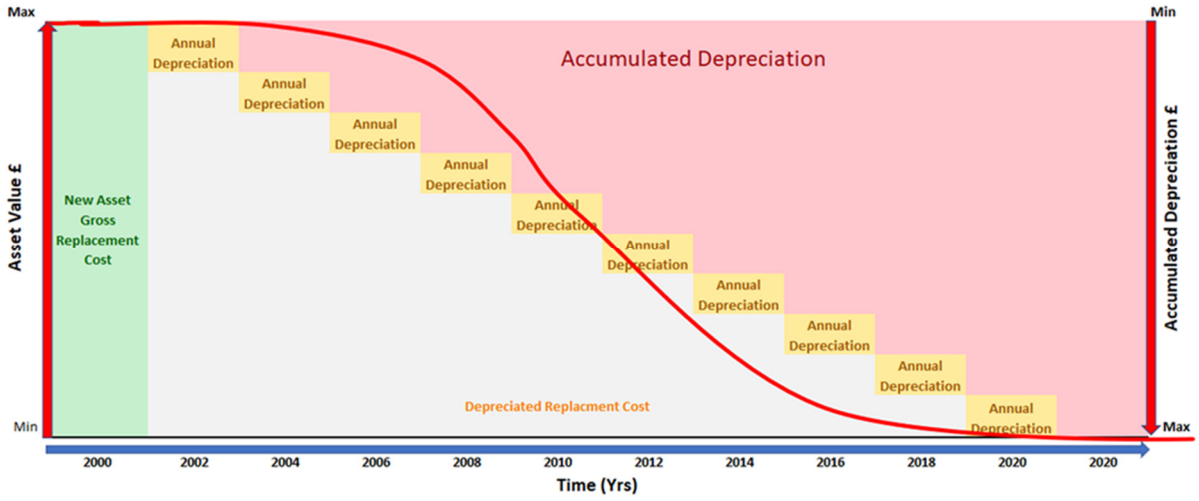

Figure 3.1 - The Asset Valuation Model (theory)

When the asset is first constructed/provided its value is 'as new' which represents the Gross Replacement Cost (GRC).

For carriageways, Accumulated Depreciation (AccD) for each road class is denoted by the percentage area of the road for which the asset life has been consumed or expired, which is then multiplied by the unit rate for resurfacing to give an 'Accumulated Depreciated Cost' for each road class.

Without maintenance the asset will deteriorate and therefore depreciate over time, giving a periodic Depreciated Replacement Cost (DRC).

DRC at the network level is given by the difference between GRC and the total 'Accumulated Depreciation'.

In practice, the asset will likely receive maintenance over its lifecycle, this can be represented by the model shown in Figure 3.2.

This has the effect of reducing the value of annual depreciation thereby lessening the effects of accumulated depreciation.

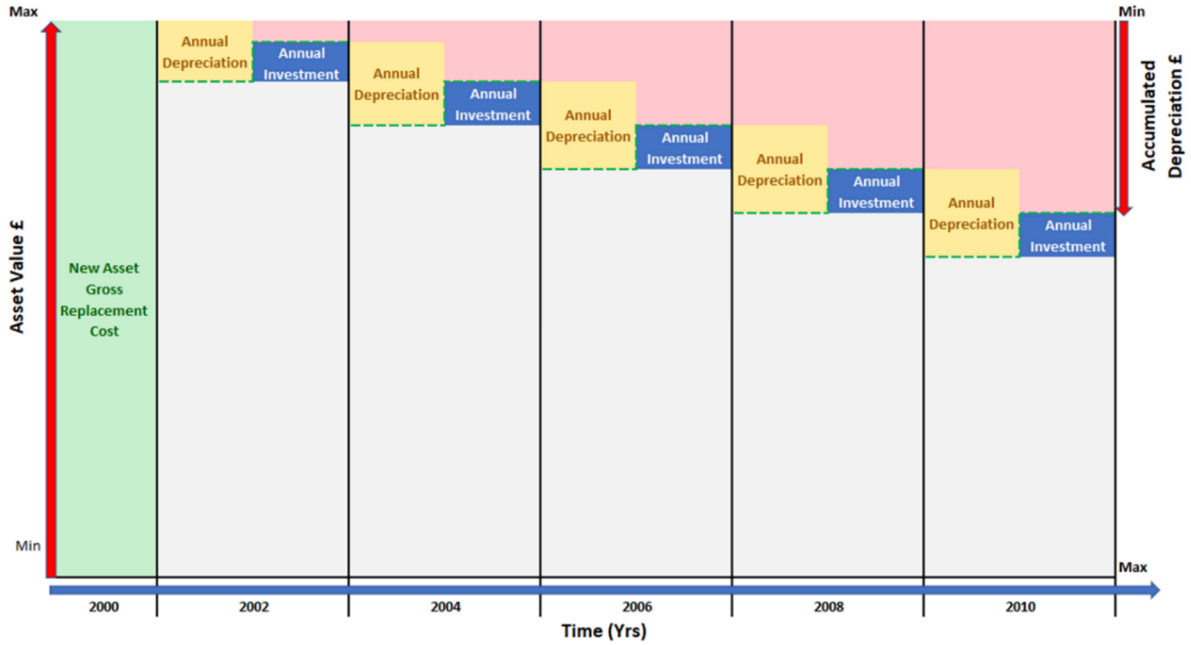

Figure 3.2: The asset valuation model including annual investment (practical)

With any investment, unless the asset is replaced as a whole it will never be considered 'new'. The term 'as new' is used as it is unlikely that an asset can be restored to its original condition without complete replacement. For example, it is unlikely that any maintenance strategy, short of a complete rebuild can return the asset to its 'new' state, however with good periodic maintenance and refurbishment, through annual investment, care and regular servicing, the asset can be maintained in a significantly reduced depreciated state.

4. What Highway Infrastructure Assets are covered by Asset Valuation?

The value of the Authority's highways infrastructure assets is of particular importance and significance as together they probably represent the Authority's most valuable asset that it owns and maintains, typically running into billions of pounds.

The process of asset valuation is undertaken on the following highways infrastructure asset types:

- Carriageways
- Footways & Cycleways
- Structures
- Street Lighting
- Traffic Management
- Street Furniture
- Land (valued by District Valuer)

The CIPFA – 'Code of Practice on Transport Infrastructure Assets' outlines three levels of assets for which asset valuation protocols may be applied. The following example from the code shows the asset levels applied to carriageways:

Level 1	Level 2	Level 3
Asset type	**Asset group**	**Components that level 2 implicitly covers**
Carriageway	• Area (square metre) based elements • Flexible pavements • Flexible composite pavements • Rigid concrete pavements • Rigid composite pavements	• Pavement layers • Other surface types, e.g. paved • Central reservation, roundabout, lay-by, traffic island, etc. • Earthworks (embankments and cuttings, retaining walls height <1.35m) • Traffic calming • Fords and causeways
	• Linear elements	• Kerbs • Line markings • Road studs • Road drainage elements (gullies, drains, etc., but not large structures) • Boundary fences and hedges • Hard strip/shoulder verges/ vegetation

Figure 4.1: Extract from Code of Practice on Transport Infrastructure Assets – CIPFA

For each 'road classification' (shown below) as denoted under the 'Carriageway' Asset Type, various data is required in order to calculate the GRC.

Road Classifications:

M (all)	A (urban) A (rural)	B (urban) B (rural)	C (urban) C (rural)	U/C (urban) U/C (rural)

5. Data Required to Value the Asset

To calculate an asset value the following information is required:

1. **Inventory**

   - Quantity or area of any components which can be valued.

     i. e.g., carriageway length/width/calculated area.

2. **Unit Rates** which are used for the calculation of GRC and Accumulated Depreciation

   - Renewal Rate – The cost to renew the item at today's rates. An example of this would be a bridge expansion joint where there is not a maintenance regime just replacement when failed or failing.
   - Maintenance Rates – the cost, at today's rates, to bring the asset up to "As New" condition. An example for carriageways would be this is deemed as 100mm structural replacement of the bituminous layers.

3. **Age**

   - Modelled by condition data as a proxy to ascertain age

   OR

   - Installation Date, the known date of asset provision/installation.

4. **Expected Life**

   The asset's expected life before requiring maintenance or renewal to return the asset to an 'as new' condition.

5. **Condition**

   Whilst age provides a good proxy for condition, in order to undertake a full assessment of the asset's value, for those assets comprising multiple elements, carriageways, structures, drainage, that are maintained and replaced to ensure the whole asset continues to meet service levels, it is desirable that this is based on measured condition.

This data will enable the Highway Authority to be able to compare the depreciated value of the asset and its annual and accumulated depreciation with the annual maintenance investment in the asset and to understand the effects of this investment on the asset's performance as given by:

- Structures – Bridge Condition Index (BCI)
- Carriageways, Cycleways & Footways – Road Condition Index (RCI)
- Drainage – Water Research Centre Index (WRC Index)

6. Asset Valuation– Terminology and Calculations

The following descriptions provide the component definitions for the calculation of asset valuation as denoted in the CIPFA toolkits:

6.1. Gross Replacement Cost (GRC)

Gross Replacement Cost is the cost of replacing an existing asset with a modern standard equivalent (MSE) of typical design standard and characteristics. It is not the cost of providing an exact duplicate of the existing asset, as these would vary as they have evolved over time and not necessarily to the standard now required. This cost is calculated using area or quantity of the asset and the unit rate to construct or replace the asset in line with current standards. This information should be held in an asset management system so it is readily available for audit and business processes and can be updated if standards and or costs change.

Calculating Gross Replacement Cost:

This is simply the inventory quantity/area multiplied by the unit construction/replacement rate.

Gross Replacement Cost (GRC) = Asset Quantity (no / lin m / sq m) x Replacement Rate

6.2. Annual Depreciation (AD)

Annual Depreciation is the average annual loss in asset value due to wear and tear represented by the cost of maintaining the assets and it should be similar if not the same as the amount of budget allocated for maintenance by the finance manager. In simple terms annual depreciation is the total cost of maintaining the asset over its service life divided by the number of years in its life.

Annual Depreciation is the average amount the asset depreciates in any one year.

In accountancy terms it is the average amount that the value overall asset value reduces, in other terms how much of the asset is “consumed” annually through deterioration.

Calculating Annual Depreciation:

Annual Depreciation (AD) = GRC / Service Life

Note: - In June 2022 the UKRLG/ADEPT Asset Management Board released the following statement for ‘Service Life’ as suggested default values in support of highways infrastructure asset valuation accounting purposes:

HAMFIG

CIPFA presented a bulletin that will help deal with an emerging issue with local authority accounts; this issue will affect all authorities eventually. CIPFA are helping to solve the problem.

A key part of the bulletin is a table of reasonable 'useful lives' that can be used to calculate depreciation; the proposed table is reproduced below.

Part of the highways network	Useful Life
Carriageways	25 years
Footways and Cycle tracks	25 years
Structures (bridges, tunnels and underpasses)	100 years
Awbrai Tunnel	175 years
Street lighting	40 years
Street furniture	Bus shelters 25 years and other assets 40 years
Traffic management systems	20 years

The Board endorsed the solution and the proposed useful lives. The Board agreed the following statement to support the proposal

"The 'useful lives' in this table are intended for accounting purposes to provide information for the Local Govt Accounts estimates process by giving typical indicative lives for various classes of highway assets. These lives indicate the time over which the initial cost of an asset should reasonably be spread. They are not intended for engineering purposes such as scheme design or lifecycle planning.

The UKRLG AM Board endorses these as reasonable estimates for this purpose and recommend their use by Local Authorities."

CAS reported that the SAVI toolkit has been updated for this year but not the other toolkits. HCC have been supporting these in recent years but funding to support these toolkits going forward.

Board agreed not to update the toolkits this year. CIPFA to include a note on this on their website.

The Highway Authority will use existing asset stock and condition data to determine its own useful life for the asset groups, developing an auditable trail of the decision process.

6.3. Accumulated Depreciation (AccD)

Accumulated Depreciation is the current cumulative depreciation of the asset. In accountancy terms it is the amount that the overall asset value has reduced by, in other words, how much of the asset has been "consumed".

In practice the asset may be replaced and consumed many times. For example, road signs, lining, streetlights and other assets with a finite life are generally wholly consumed when replaced.

However, some assets such as bridges, carriageways, cycleways, drainage, footways, and other assets with an effective infinite life are maintained by the renewal of elements of the asset thus prolonging the life of the asset.

Calculating Accumulated Depreciation:

Accumulated Depreciation (Acc D) = AD x no of years (from 'as new' to the present day)

6.4. Depreciated Replacement Cost (DRC)

Depreciated Replacement Cost within accounting is used to provide a measure of the cost of the economic benefits embodied in an asset that have been consumed during the accounting period. Specifically, it is the decline in value of an asset due to its wear and tear.

6.4.1. Calculating Depreciated Replacement Cost:

Depreciated Replacement Cost = Gross Replacement Cost -Total Accumulated Depreciation.

6.4.2. Calculations

The above terminology provides a summary of the component definitions for asset valuations, however, when it comes to calculating the asset's valuation a more detailed and realistic assessment will be required in order to meet accounting practice provisions. The reason for this is that as the valuation of the highway's infrastructure assets is a key part perhaps the largest asset value that the Council may have, and as such it will have a significant influence on the Councils accounts.

6.5. Depreciated Replacement Cost (DRC) - Realistic Calculation

To calculate the DRC, the first step is to calculate the Accumulated Depreciation, how much of the asset condition or value has been consumed at the time of calculation. Different assets have different deterioration models dependent on whether they are finite or infinite assets and whether the assets deterioration can be modelled as a straight-line or "S-curve" deterioration.

6.5.1. Finite Assets

A finite asset starts deteriorating at a uniform rate from day one and can be represented as a straight-line deterioration as shown in Figure 6.1.

Accountancy does not like large shifts in reporting therefore the straight-line deterioration curve is the preferred method to use.

This is method for calculating the depreciated replacement cost works for most finite life assets. For example, a road sign, line, streetlight will decrease in value every year, until it fails, due to wear and tear so needs to be replaced.

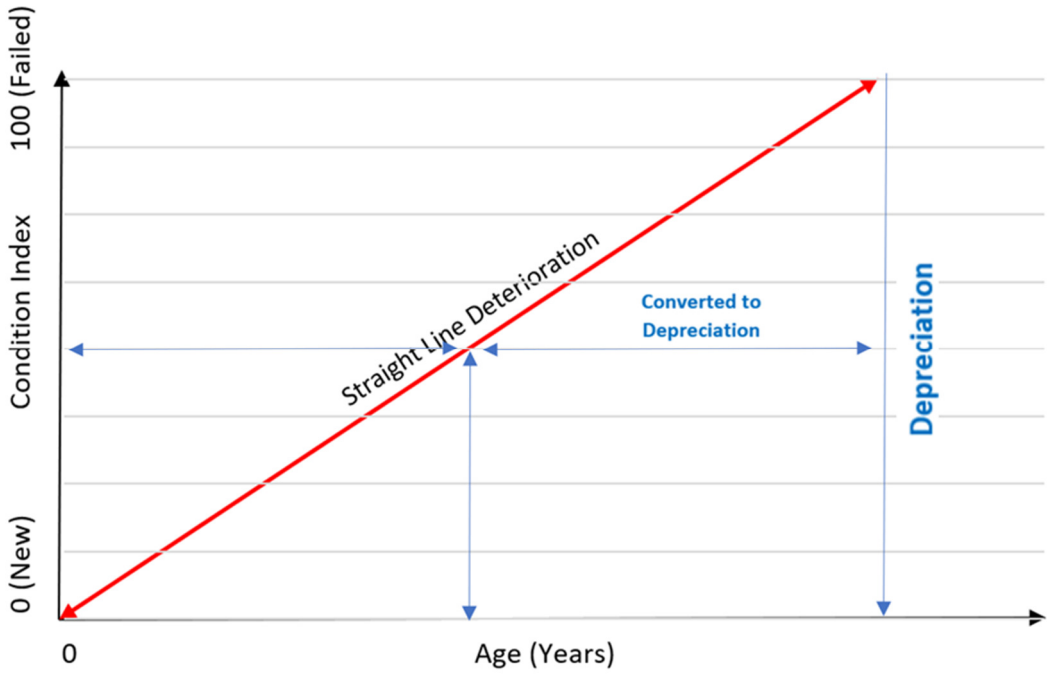

Figure 6.1: Straight Line Deterioration

6.5.2. Infinite Assets

In certain circumstances a straight-line deterioration model is not necessarily that realistic, when assessing the deterioration of some highway's assets. For such assets it is better to develop an "S-curve" deterioration model that better reflects the actual deterioration of the asset as shown in Figure 6.2.

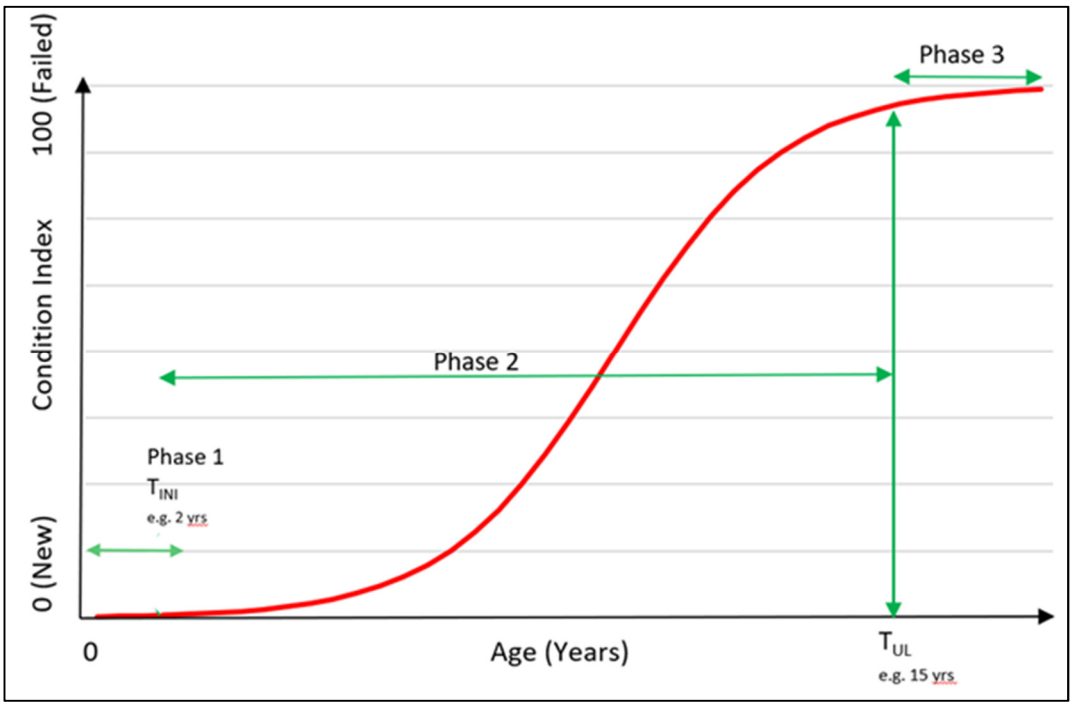

Figure 6.2: "S-curve" Deterioration

Where an asset initially does not depreciate very quickly over several years, then depreciates more rapidly but at a broadly steady state until at another point in time where it resumes a slow deterioration mode, this can be represented as a "S-curve" deterioration. For example, a carriageway retains its inherent strength over the first few years, therefore there is no measurable deterioration over this period (Phase1). There is then a more constant rate of deterioration of the carriageway (Phase 2), until it exhibits the onset of structural failure whereupon the deterioration rate slows down (Phase 3).

Phase 1 – T_{INI} is the initial period when no defects are recorded against the asset. It is not showing any signs of deterioration and is performing as a "new" asset, this phase will vary by asset and location, however it is expected to be for a relatively short period of time of several years.

Phase 2 – This phase is where the condition surveys of the asset is showing signs of deterioration and covers a large range of deterioration from slight to severe. This phase can be over a very long period.

Phase 3 – This phase is known as T_{UL} whereby the total useful life of the asset is consumed, but it has not yet completely failed in its performance. This phase of the asset lifecycle can be a short period of time, but it can also be more prolonged and vary considerably reflective of asset type, environment, usage, etc.

The first and last phases of the deterioration T_{INI} & T_{TUL} are described below.

T_{INI} - Deterioration Initiation

Average time (years) from start of lifecycle before discernible deterioration would first be measurable.

Not all non-defective roads are brand new so for such roads the depreciation calculation will age all non-defective roads as half the value of T_{INI}. Whilst this will not be accurate for individual roads, it will provide the average age of all the non-defective roads when considering the network as a whole.

CIPFA Guidance suggests T_{INI} be taken as:

- 4-6 years for A Roads
- 7-8 years for B & C Roads
- 5-9 years or U Roads

T_{TUL} - Total Useful Life

Average time (years) after which the pavement surface has been fully consumed and needs replacement.

In appropriate cases make allowances for traffic growth and severe weather, CIPFA guidance suggests T_{TUL}

- 21 years for Classified Roads
- 17-25 for Unclassified Roads

Figure 6.3 then adds a straight-line deterioration for the purpose of calculating the age-based depreciation.

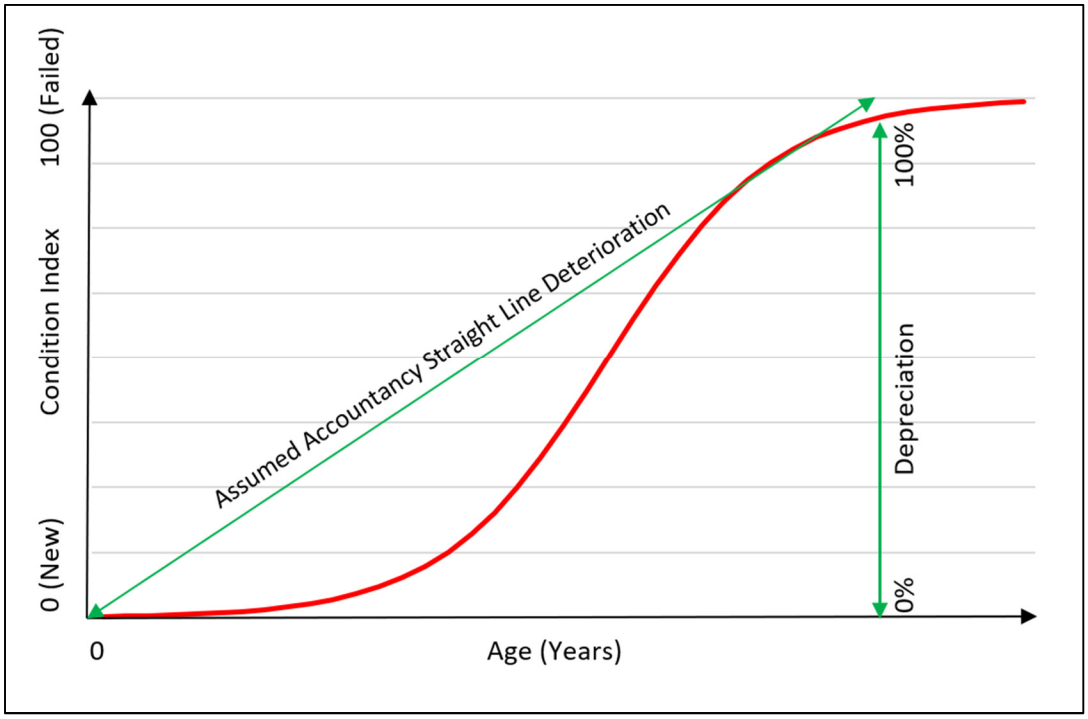

Figure 6.3: "S-curve" Deterioration developed into Straight Line Accountancy.

When an asset has reached T_{UL}, it is classed as reaching the end of its useful (service) life and is therefore 100% depreciated (consumed).

Upon defining the profile of the “S-curve” the condition index can then be converted to age on the “S” curve, projected up to the straight-line of deterioration and related across to the age-based depreciation scale to provide a more accurate understanding of the assets true depreciated value, see Figure 6.4 below.

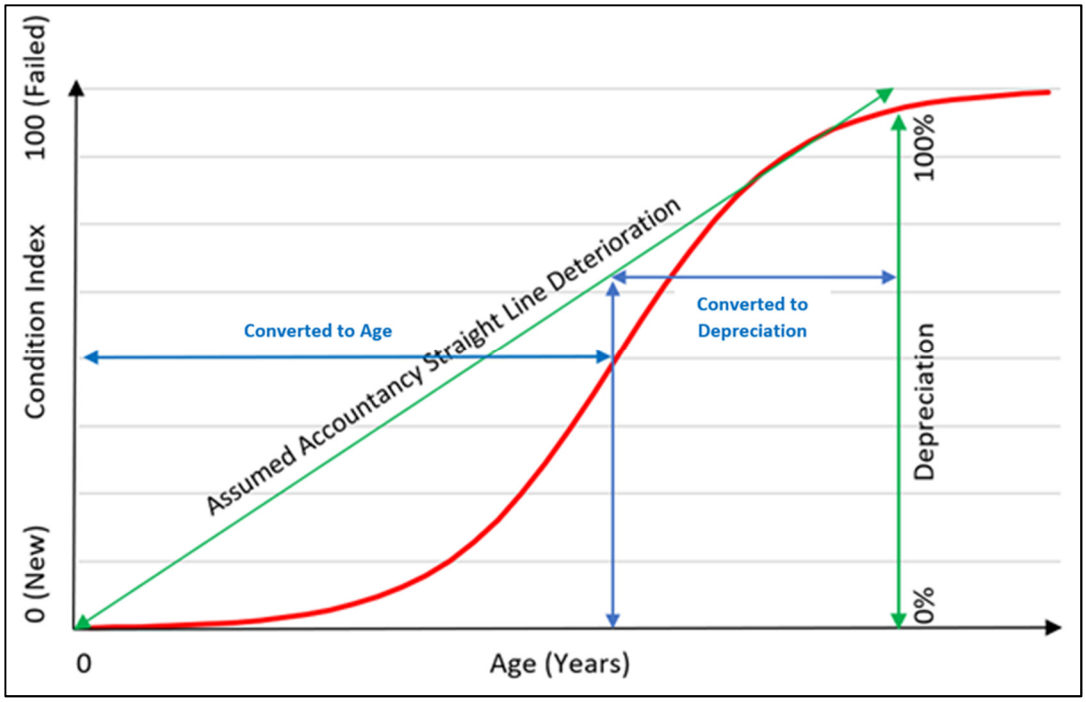

Figure 6.4: “S-curve” Deterioration developed to calculate Depreciation

7. Summary - The Asset Valuation Process

The process of asset valuation is best achieved through industry accredited data collection and computer modelling of the highways assets to calculate GRC, AD, AccD and DRC and to secure a full and complete financial valuation of the asset type.

Historically, CIPFA have provided various asset type toolkits by which the Highway Authority may enter their data, calculate the asset valuation figures and report their valuations in a standardised and nationally comparable manner. This is further supported via industry accredited asset management data processing systems for the complete processing of the Authority's highways infrastructure asset data.

The following steps provide the key stages to achieving the asset valuation process:

1. Asset Information
    - Implement survey processes to collect asset inventory and condition data
2. Treatment Costs
    - Determine unit rates for the maintenance/replacement of the asset inventory items, and assets elements
3. Asset Modelling
    - Apply and follow the applications provided in the CIPFA Valuation Toolkits (or equivalent process) for the various highways infrastructure asset types to process and model the data to deliver expected lives, lifecycle plans and asset age, used to determine and calculate GRC, AD, AccD and DRC
4. Data Management, Valuation and Submission
    - Generate the AV reports and submit the asset valuation data to the Authority's Finance Group for WGA registration

8. Audit Review

As with all accounting practice there is a likelihood that the asset valuation calculations and accounts will be subject to audit review. For this reason in undertaking any valuation of the assets comprising the highway infrastructure network the process should be:

- Consistent
- Transparent
- Repeatable
- Auditable

At the outset of the AV process steps should be taken to enable sufficient audit checks to be put in place. The data therefore needs to demonstrate:

- Asset Ownership
- Quality
- Accuracy
- Currency
- Completeness

In addition, the data modelling and processing protocols applied to asset valuation should:

- Demonstrate an assessment of asset condition and lifecycle treatments
- Provide access to supporting documents
- Clearly define the modelling procedure through:
    - Method
    - Input
    - Calculation
    - Assessment

- Generate the requisite outputs and reports which are suitable for submission in support of the Authority's Whole of Government Accounting provisions

Close liaison and mutual support between the Authority's finance professionals and infrastructure engineers is strongly advised throughout the AV calculation process in order to secure a clear understanding of the data used and the processing regimes applied. This will help mitigate any audit review challenges received and it provides a sound platform from which to generate the AV calculations and draft the final report for WGA submission.

9. How does Asset Valuation help with Asset Management disciplines?

Asset management and asset valuation are linked disciplines that provides the engineering user and the Highway Authority with the following benefits:

- Asset valuation links asset type condition, deterioration and maintenance to the financial investment applied to the maintenance of the asset to enable value for money factors to be considered

- It provides the accountants and engineers with a view on how well the financial investment they make into the asset is managing the deterioration

- It highlights gaps in investment and effectively informs on what the maintenance backlog is, or what the outstanding investment in the asset is and it indicates the investment required to return the asset to an acceptable condition and service level

- Annual asset valuation trend data is helpful in demonstrating the effectiveness of investment decisions and in focusing on where future maintenance priorities may be applied