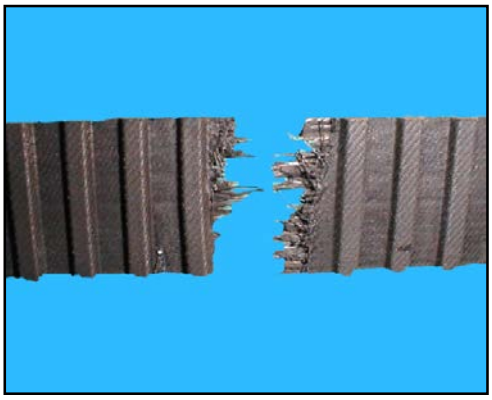

## BELT BREAK (STRAIGHT)

**FEATURES:**

**Belt break at 90 degree to belt length.**

**CAUSES:**

**A) Handling crimp prior to use.**
**B) Use of lever to fit.**
**C) Too high tension.**

**GENERAL:**

**A) As a rule the belt may appear perfectly serviceable other than the failure point. If the belt is pinched during handling then the fibreglass cords can fracture resulting in a tensile weak point.**

**B) Similarly the use of leverage I.e. screwdriver to lead the belt onto its pulleys will initiate cord breakage albeit on the edge. This fatigue point will quickly run across the belt and ultimate failure will occur.**

**C) Too high tension is normally partnered by noisy, "whining" operation. As the engine expands the tension increases to the point of overload and a direct clean break will occur. Tooth valley/land damage might also be evident.**

**ACTION:**

**DO NOT crimp or bend belts through a radius less than that of the crankshaft pulley. Do not turn belts inside out. Ensure tension is to OEM specification on a cold engine and repeat during belt "settle-in" period.**

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## BELT BREAK (ANGULAR)

**FEATURES:**

**Belt break at an acute angle with jagged tear edges.**

**CAUSES:**

**A) Pulley edge climb.**
**B) Snatch tension.**

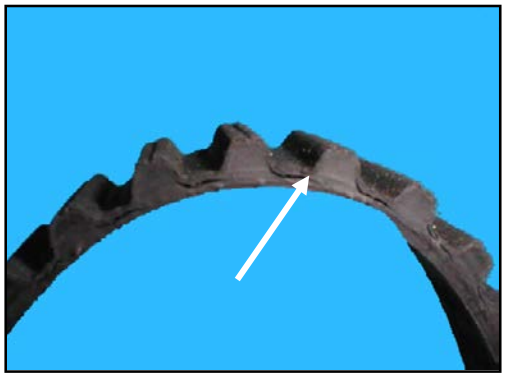
**GENERAL:**

**A) Normally a belt which has tried to climb a pulley flange will also show tooth edge wear. As the belt tries to ride up the pulley an over-tension situation is created. The initial break point is due to cord fracture at peak climb.**

**B) A snatch tension can be caused by intrusion of a foreign object into the belt drive. Tooth and valley bruising can also be witnessed at point of intrusion.**

**ACTION:**

**Ensure belt runs clear of pulley flanges and that belt guards are fitted and are effective in protecting the belt train.**



## TEETH VALLEY CRACKS (INDIRECT)

**FEATURES:**

**Cracks under the fabric teeth facing.**

**CAUSES:**

**Low tension.**

**GENERAL:**

**Teeth exhibit indirect valley cracks which are inaccessible. They are under the elastic nylon overlay and run the entire length of the belt. Low tension operation allows the teeth to rise out of pulley and a rolling effect is created. The adhesion of the nylon overlay becomes unbonded and a crack appears. Crack development will extend into the teeth and fabric will break to produce an open crack.**

**ACTION:**

**Ensure tension is to OEM specification on a cold engine and repeat procedure during belt "settle-in" period.**

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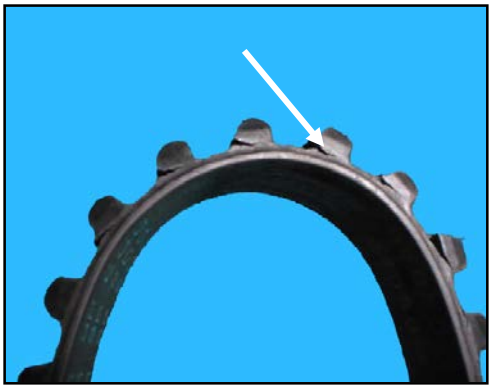


## TEETH VALLEY CRACKS (DIRECT)

**FEATURES:**

**"Whale mouth" cracks.**

**CAUSES:**

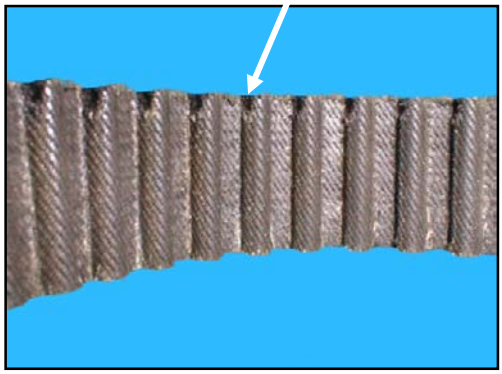
**Extreme low tension.**

**GENERAL:**

**Affectionately known as "whale mouths". Teeth exhibit direct open cracks which are normally present on entire length of the belt. Cracks may be more apparent on one side of the belt or equally be of the same severity across belt width. Low tension operation allows the teeth to climb the pulley and an imposed rolling effect of the teeth occurs whereby fatigue cracks are initiated. Natural crack progression to the point of teeth strip will quickly result.**

**ACTION:**

**Ensure tension is to OEM specification on a cold engine and repeat procedure during belt "settle-in" period.**



## TEETH EDGE DAMAGE

**FEATURES:**

Even "cut-out" damage to teeth on the belt edge.

**CAUSES:**

Pulley damage.

**GENERAL:**

Uniform tooth damage would be normally attributed to a raised burr on an idler sprocket. Intermittent tooth damage would suggest either the camshaft or crankshaft sprockets to be damaged. Extent of material loss to belt is normally directly proportional to the pulley damage. Belt failure could result particularly if the teeth's material loss contaminates the rest of the pulley drive.

**ACTION:**

Inspect and rectify/renew pulleys as necessary. DO NOT clean pulleys with metal scrapes or wire brushes, use wooden scrapes or a soft brush. DO NOT clean with solvents as oil seal damage could result.

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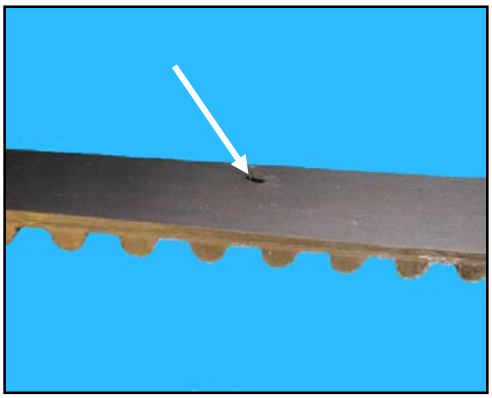


## BELT BACKING PUNCTURE

**FEATURES:**

Raised bruise or raised open flat.

**CAUSES:**

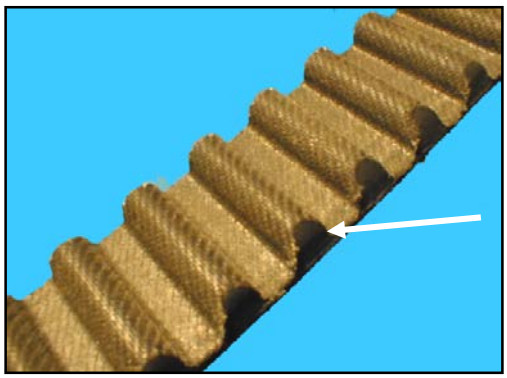
Intrusion of foreign body.

**GENERAL:**

Normally attributed to ingress of a stone into the belt train. The stone punctures the belt tooth or valley as it is compressed and passed around a rotating pulley. The intruder might be exhausted through the back of the belt, or might remain entrapped especially if embedded into a tooth. Cord fracture can occur creating an immediate weak point and a belt break failure might result.

**ACTION:**

Ensure belt guards are fitted and that they are effective in protecting the belt train.



## EDGE WEAR (SMOOTH)

**FEATURES:**

**Belt teeth radiused inwards with polished appearance.**

**CAUSES:**

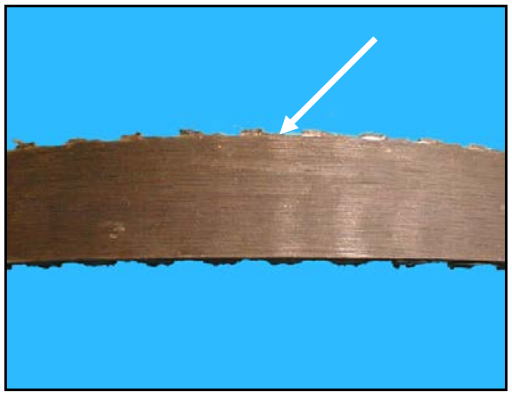
**Belt running off centre. Misaligned pulleys.**

**GENERAL:**

**Belt teeth exhibiting polished inward radiused wear on one edge only, due to the belt just touching the drive pulley's flange. Wear is minor and will not necessarily result in failure. However in some cases further belt edge climb could occur and damage as viewed in the next photo would lead to ultimate belt snatch break.**

**ACTION:**

**Ensure new belt runs clear of pulley flanges. Re-align as necessary. Address any excessive crankshaft end float.**



## EDGE WEAR (JAGGED)

**FEATURES:**

**Jagged edge wear with frayed fibrous appearance.**

**CAUSES:**

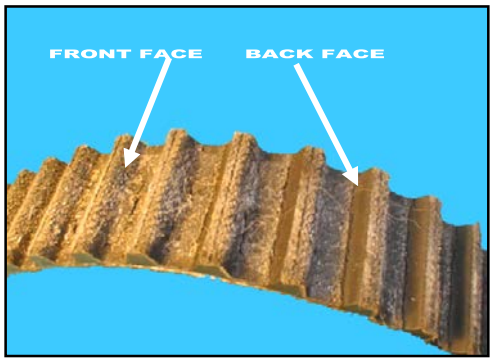
**Pulley flange climb.**

**GENERAL:**

**Belt edge contacts the pulley flange and induces a climbing action which effectively pulls the belt further in. Depending on roughness of pulley flange chafing will develop and a jagged/fibrous edge results.**
**Obvious belt thinning and weakness will lead to ultimate failure.**

**ACTION:**

**Ensure new belt runs clear of pulley flanges. Re-align as necessary. Address any excessive crankshaft end float.**




## TOOTH FACE WEAR

**FEATURES:**

**Teeth FRONT FACES are worn with fibrous appearance.**
**Teeth BACK FACES are maiden.**

**CAUSES:**

**Extreme low tension.**

**GENERAL:**

**Drive side of belt teeth are worn/undercut with fibrous white appearance. Back (non-drive) side of teeth are literally as new with no wear. Again a common failure due to extreme low tension. Belt rides out of pulley teeth and thus total belt load is concentrated on this reduced tooth contact. Compounded by the teeth outward movement wear is very visual and obvious.**

**ACTION:**

**Tension as per OEM specification on a cold engine and repeat procedure during belt "settle-in" period.**

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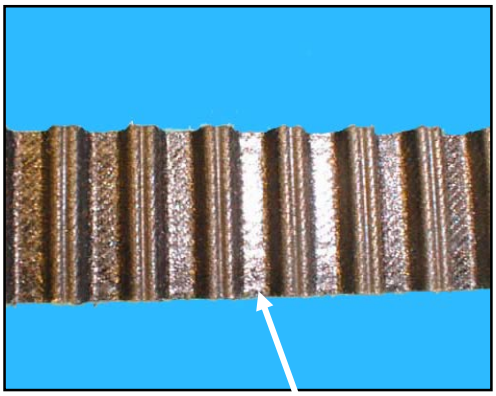


## LAND WEAR

**FEATURES:**

**Polished or fibrous tooth roots/lands.**

**CAUSES:**

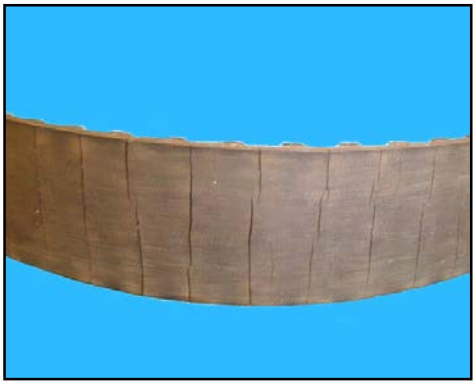
**High tension.**

**GENERAL:**

**Over-tensioning causes pulley teeth to bottom out and over-contact the tooth roots. Initially load polishing occurs which then develops to the elastic nylon fabric becoming frayed and fibrous in appearance. Belt will fail with possible other over-tension symptoms.**

**ACTION:**

**Ensure tension is as per OEM specification on a cold engine and repeat procedure during belt "settle-in" period.**



## BELT BACKING CRACKS

**FEATURES:**

**Severe cracking on belt back.**

**CAUSES:**

**Extreme temperatures (hot and cold).**

**GENERAL:**

**Cracks of this type will weaken the back of the belt producing hundreds of fatigue points which will lead to ultimate belt break. The cause of extreme temperatures can be on opposite scales.**

**TOO COLD. During very bad weather conditions where temperatures fall below 0 C the belt can become rigid and less pliable. Rotating a frozen belt will initiate belt cracks.**

**TOO HOT. Normally associated with friction due to seized/or seizing idler pulleys. Heat obviously work hardens the rubber backing inducing a brittle skin.**

**ACTION:**

**In all instances, be it hot or cold failures, it pays to play safe and renew belt idler pulleys.**

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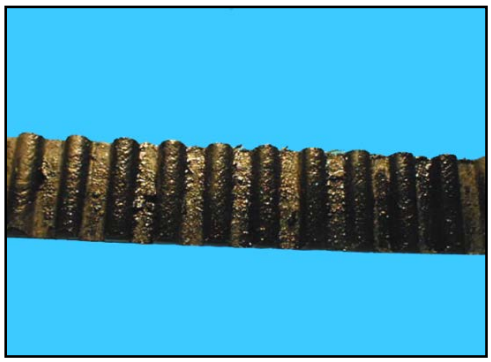

## OIL CONTAMINATION

**FEATURES:**

**Belt visually oily / greasy.**

**CAUSES:**

**Oil leaks.**

**GENERAL:**

**Oil seal leakage will centrifuge oil onto the belt. Dust and particle contamination will form a sticky residue. Rubber may become swollen and the teeth fabric will lose its adhesion and begin to delaminate. Belt's tensile properties will be lost and failure will result.**

**ACTION:**

**Cure any oil leaks and check at regular intervals.**