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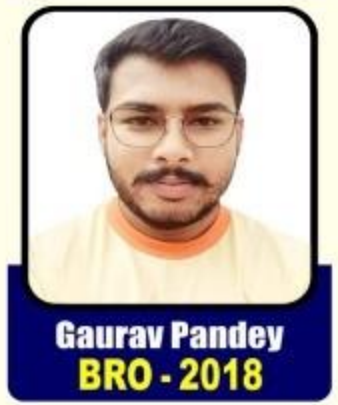

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ARCHES

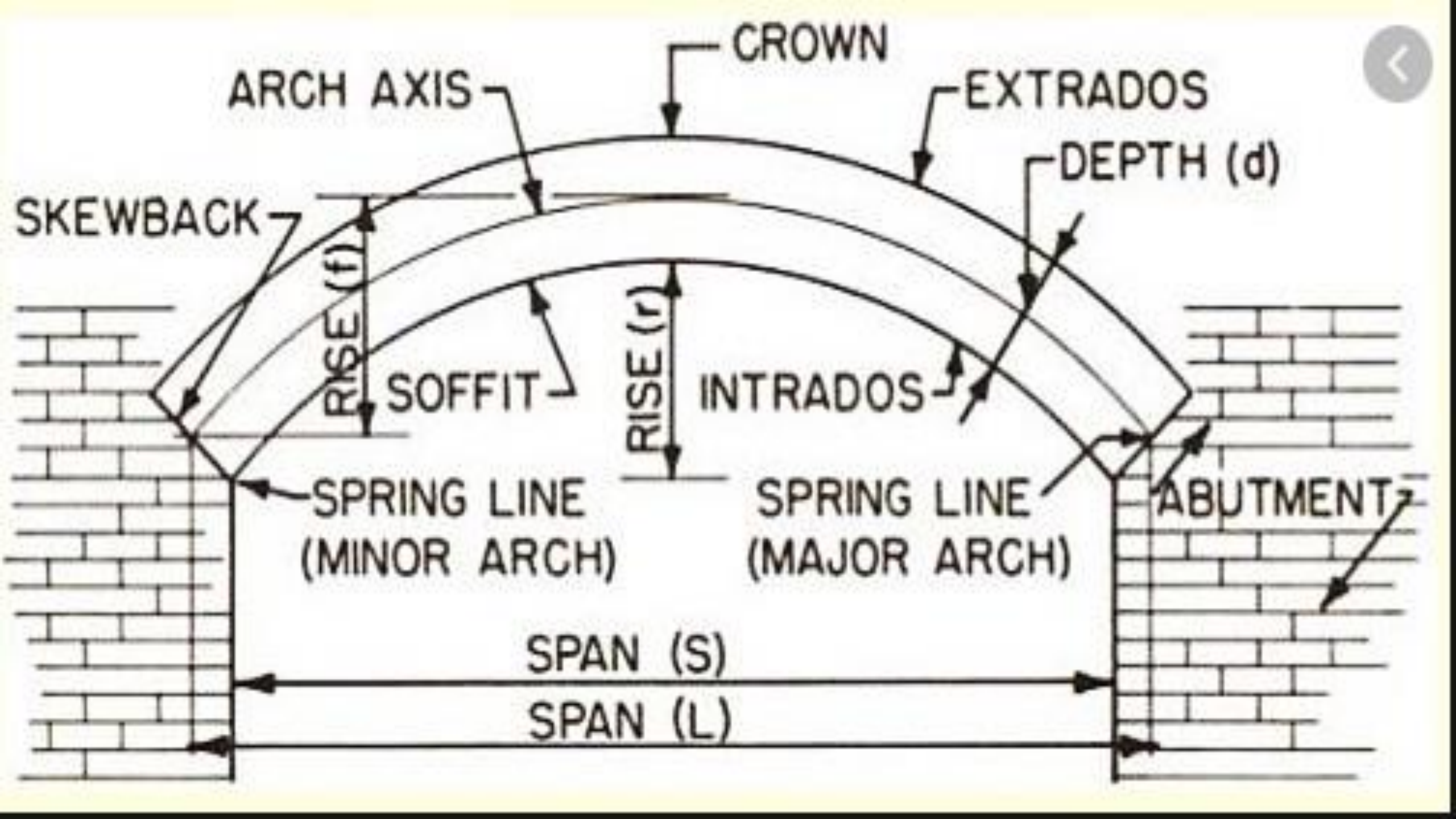
INTRODUCTION

- **An arch is a structure constructed of wedge-shaped units, jointed together with mortar & spanning an opening to support the wall above it with other super-imposed loads.**

- **Due to wedge-like form, the units support each other, the load tends to make them compact & enables them to transmit the pressure downwards to their supports.**

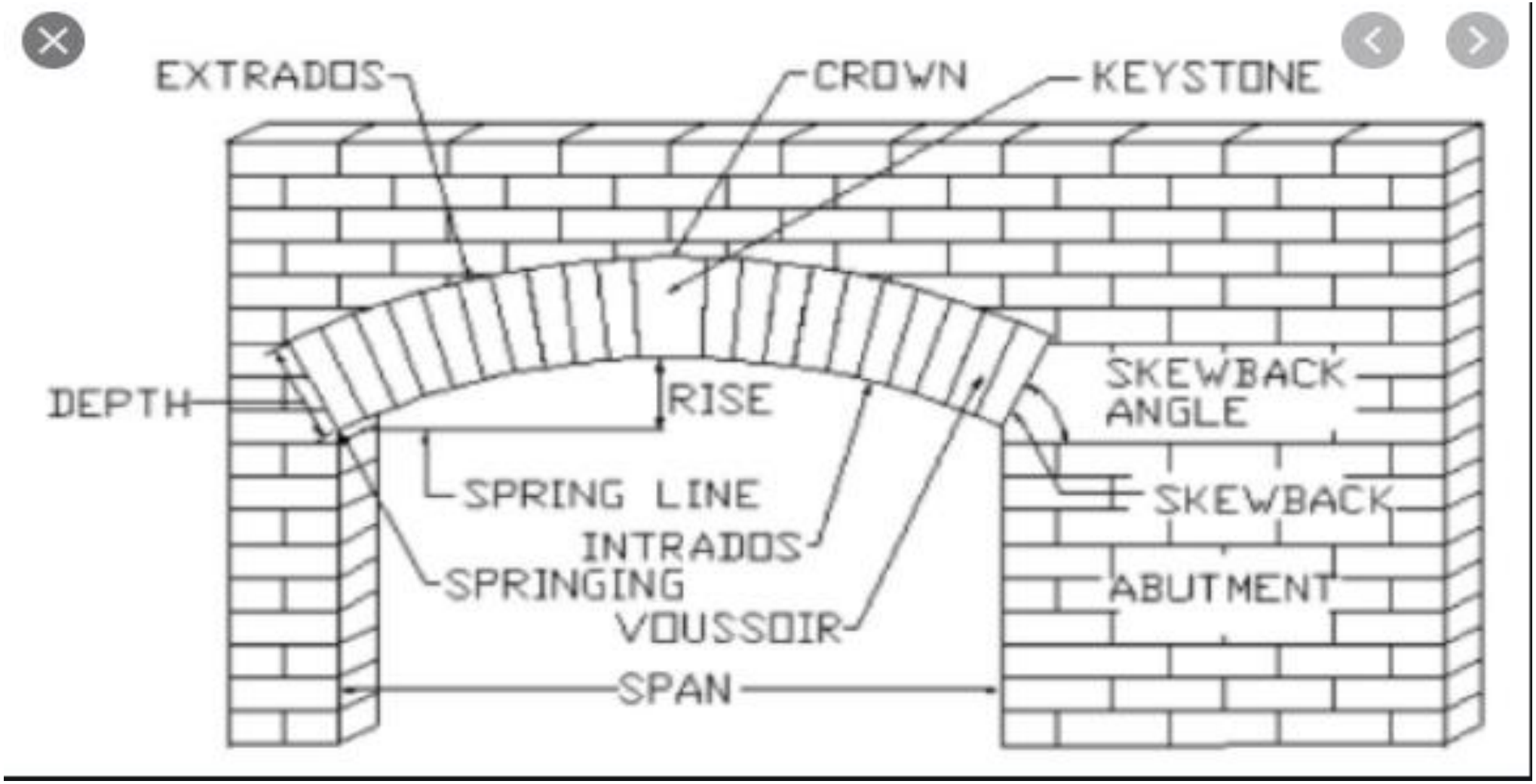
ELEMENTS OF SEGMENTAL ARCH

- **INTRADOS:-** This is the inner curve of an arch.
- **SOFFIT:-** It is the inner surface of an arch. Sometimes, intrados & soffit are used synonymously.
- **EXTRADOS:-** This is the outer curve of an arch.
- **VOUSSOIRS:-** These are wedge-shaped units of masonry, forming an arch.
- **CROWN:-** it is the highest part of extrados.
- **KEY:-** it is the wedge-shaped unit fixed at crown of the arch.
- **SPANDRIL:-** This is the triangular space formed between the extrados & the horizontal line through the crown.


CROWN
ARCH AXIS
EXTRADOS
DEPTH (d)
SKEWBACK
RISE (f)
SOFFIT
RISE (r)
INTRADOS
SPRING LINE
(MINOR ARCH)
SPRING LINE
(MAJOR ARCH)
ABUTMENT
SPAN (S)
SPAN (L)

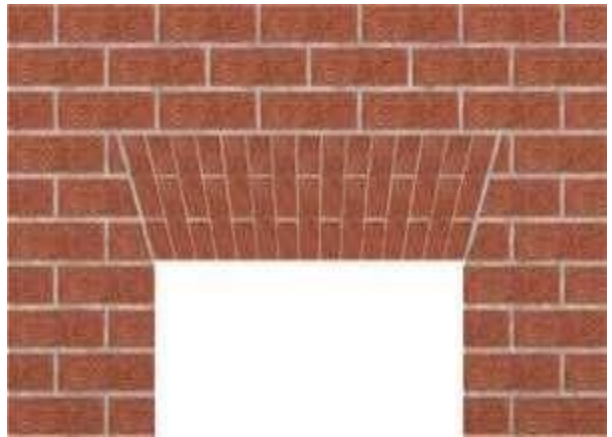
ELEMENTS OF SEGMENTAL ARCH

- **ABUTMENT:-** This is the end support of an arch.
- **PIER:-** This is the intermediate support of an arcade.
- **ARCADE:-** It is a row of arches in continuation.
- **SKEW BACK:-** This is the inclined surface on the abutment, which is so prepared to receive an arch.
- **SPRINGING LINE:-** It is an imaginary line joining the springing points of either end.
- **SPRINGER:-** it is the first voussior at springing level. It is immediately adjacent to the skewback.
- **HAUNCH:-** It is the lower half of the arch between the crown and skew back.


EXTRADOS
CROWN
KEYSTONE
DEPTH
RISE
SKEWBACK
ANGLE
SPRING LINE
SKEWBACK
INTRADOS
SPRINGING
ABUTMENT
VOUSSOIR
SPAN

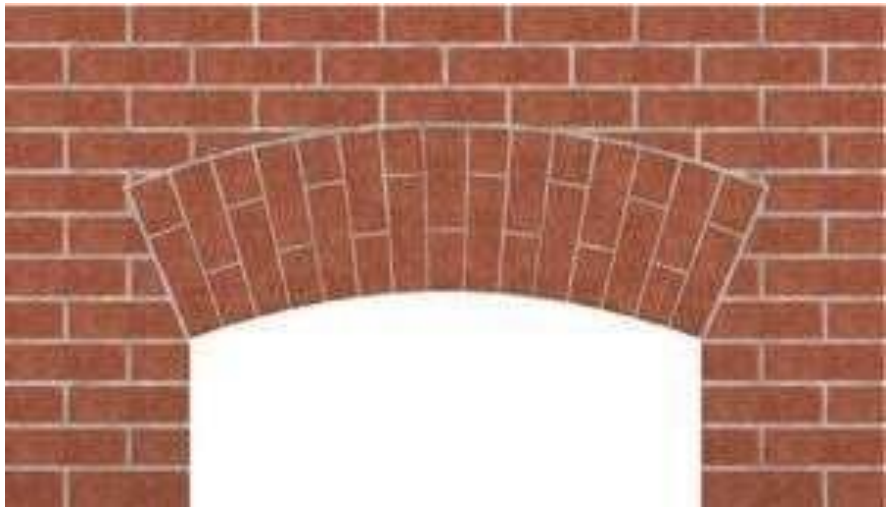
Based on shape: Flat Arch

- In this the intrados is apparently flat and it acts as a base of equilateral triangle which was formed by the horizontal angle of $60^0$by skewbacks.
- Extrados is also horizontal and flat.
- These flat arches are generally used for light loads, and for spans up to 1.5m.



Segmental Arch

- This is the basic type of arch used for buildings in which Centre of arch lies below the springing line.
- In segmental arch, the thrust Transferred in inclined direction to the abutment.



Semi-Circular Arch

- The shape of arch curve looks like semi-circle and the thrust transferred to the abutments is perfectly vertical direction since skewback is horizontal.
- In this type of arch, the Centre lies exactly on the springing line.

Horse Shoe Arch

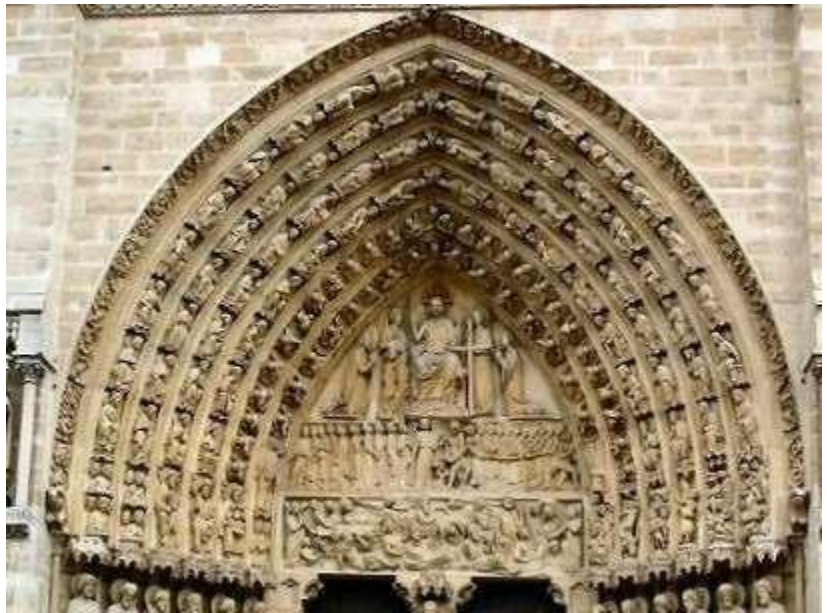
- Horse Shoe Arch is in the shape of horse shoe which curves more than semi-circle.
- This is generally considered for architectural provisions.

Venetian Arch

- It is also pointed arch but its crown is deeper than springing.
- It contains four Centre’s, all located on the springing line

Pointed Arch

- It is also known as Gothic arch.
- In this type of arch two arcs of circles are met at the apex hence triangle is formed.
- This may be either isosceles or equilateral.



Relieving Arch

- It is constructed above flat arch or on a wooden lintel to provide greater strength.
- In this, we can replace the decayed wooden lintel easily without disturbing the stability of structure.
- The ends of this arch should be carried sufficiently into the abutments.

Gauged brick arches

- In this type arch, bricks are cut to exact shape and size of required voussoir with the help of wire saw.
- The bricks are finely dressed and these bricks are joined by lime putty.
- But, for gauged brick arches only soft bricks are used.

The vertical distance between the springing line and highest point of the inner curve of an archis known as:

A : Intrados

B : Spandril

C : Rise

D : Extrados

The highest point on the extrados of the arch is known as

A : Summit

B : Ridge

C : Crown

D : Peak

Soffit is

A : The under surface of an arch

B : The top surface of an arch

C : The curvature of an arch

D : None of the above

When the rise of an arch is more than the span,then the arch is called as

A : Lancet arch

B : Venetian arch

C : Drop arch

D : Ogee arch

…….is the triangular walling enclosed by the extrados of the arch, a horizontal line from the crown of the arch and a perpendicular line from the springing of the outer curves.

A : Haunch

B : Spandril

C : Key stone

D : Voussoirs

The effect of arching a beam is

A : To Increase Bending Moment Throughout

B : To Increase Shear Force

C : To Reduce Bending Moment Throughout

D : To Decrease Shear Force